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MANUAL
OF THE
FLOWERING PLANTS
OF
IOWA

PART I. POLYPETALAE.

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T. J. FITZPATRICK

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MANUAL
OF THE
FLOWERING PLANTS
OF
IOWA

BY

T. J. FITZPATRICK.
Fellow of the Iowa Academy of Sciences

THESES.

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P R E F A C E.

THIS volume is the result of continued study of the flowering plants of Iowa during a period of seven years. The author has collected in more than thirty counties and in most portions of the state. To the collections thus obtained the author's many friends have made generous additions either by donation or by exchange. So far as possible all the literature relating to Iowa botany has been canvassed and the collections in the State University have been examined. All previous treatises have been in the nature of lists; many annotated, some not; and were mostly confined to the flora of restricted localities. In this volume all the scattered information is gathered and the author endeavors to correct previous errors, to confirm the observations already made, and to add new information obtained by personal effort.

This work is founded primarily upon the private herbarium of T. J. and M. F. L. Fitzpatrick and in this connection the author wishes to state that he is under obligations to the following parties who have sent many rare or infrequent and interesting specimens: Fred Reppert of Muscatine county, Prof. B. Fink of Fayette county, E. W. D. Holway and Herbert Goddard of Winnesheik county, R. I. Cratty of Emmet county, Prof. Pammel, C. R. Ball and Wilmon Newell of Iowa State College, J. P. Anderson of Decatur county, J. H. Mills of Henry county, and Profs. T. H. Macbride and B. Shimek of the State University, and to many others who have lent aid in a limited amount. In the determination of difficult material the author has received aid from Prof. Wm. Trelease and Prof. J. B. S. Norton of the Missouri Botanical Garden, F. Lamson-Scribner of the U. S. Department of Agriculture, and R. I. Cratty.

The question of nomenclature is as yet unsettled. For some reason the new nomenclature has not been received with much favor by Iowa botanists. Because of this the author has thought it best to pursue a conservative course. All needful changes have been adopted and by the use of synonyms both the old and new systems are presented.

The author shall be pleased at all times to receive information and material so that he may be able to extend his knowledge of a subject the pursuit of which has been a source of much pleasure.

T. J. FITZPATRICK.

LAMONI, Iowa, July 30, 1890

MANUAL OF THE FLOWERING PLANTS OF IOWA.

ANALYTICAL KEY TO THE FAMILIES.

Series 1. PHANEROGAMS or FLOWERING PLANTS: those producing true flowers and seeds.

Class 1. ANGIOSPERMS: plants which have the ovules contained in a closed ovary.

Subclass 1. DICOTYLEDONS: stems differentiated into bark, wood, and pith; leaves netted-veined; embryo with a pair of opposite cotyledons; flowers usually 4 or 5-merous.

Division 1. POLYPETALAE: calyx and carolla present, petals separate. Apetalous forms occur as will be noted farther on.

The following wholly artificial key is taken from various governmental publications and adapted to the Iowa flora.

A. Stamens ten to many and more than twice the number of sepals.

* Calyx entirely free from the ovary.

Pistils many, distinct, enclosed in a hollow receptacle; leaves alternate, stipulate. Rosa, in ROSACEAE, 49.

Pistils several, contained in pits on the upper surface of a large convex receptacle. Nelumbo, in NYMPHAEACEAE, 7.

Pistils more than one, distinct, not enclosed in the receptacle. Stamens inserted on the edge of a disk which lines the calyx-tube, distinct; anthers 2-celled. ROSACEAE, 44.

Stamens monodelphous, united with the base of the petals; anthers 1-celled. MALVACEAE, 23.

Stamens inserted on the receptacle.

Small trees; filaments shorter than the anthers. ANONACEAE, 6.

Herbs or woody climbers; filaments longer than the anthers.

Flowers diœcious; twiners; leaves alternate, palmately lobed.

MENISPERMACEAE, 7

Flowers perfect, if climbers the leaves are opposite.

Leaves peltate; petals persistent.

Brasenia, in NYMPHAEACEAE, 7.

Leaves not peltate; petals deciduous. RANUNCULACEAE, 1.

Pistils several-lobed, the ovaries united below the middle. RESEDACEAE, 16.

Pistils several, their ovaries cohering in a ring around an axis.

MALVACEAE, 23.

Pistil solitary as to the ovary but styles or stigmas may be several.

Leaves punctate with pellucid or black dots. HYPERICACEAE, 22.

Leaves not punctate with pellucid or black dots.

Ovary simple, 1-celled, 2-ovuled; fruit a drupe. DRUPACEAE, 43.

Ovary simple, 1-celled, several-ovuled; fruit a legume.

MIMOSACEAE, 43.

Ovary compound, 1-celled; placenta central. PORTULACACEAE, 21.

Ovary simple, 1-celled; placenta parietal, many-ovuled.	
Leaves 2-3-ternately compound or dissected.	RANUNCULACEAE, 1.
Leaves peltate, palmately lobed.	
Podophyllum, in BERBERIDACEAE, 7.	
Ovary compound, 1-celled; placentae 2 or more, parietal.	
Sepals caducous; juice milky or colored. PAPAVERACEAE, 9.	
Sepals deciduous, 4. CAPPARIDACEAE, 16.	
Sepals persistent, 3 or 5. CISTACEAE, 17.	
Ovary compound, several-celled.	
Calyx valvate in the bud, and persistent; stamens monodel-	
phous; anthers 1-celled. MALVACEAE, 23.	
Deciduous; anthers 2-celled. TILIACEAE, 25.	
Calyx imbricated in the bud, persistent.	
Ovaries on many partitions; aquatics. NYMPHAEACEAE, 7.	
Ovaries on 5 placentae in the axis. SARRACENIACEAE, 9.	
* * Calyx more or less coherent with the surface of the compound ovary.	
Ovary 8-30-celled; ovules many, on partitions, aquatic.	
	NYMPHAEACEAE, 7.
Ovary apparently 10-celled, each division 1-ovuled.	Amelanchier, in POMACEAE, 49.
Ovary 2-5-celled.	
Leaves alternate, stipulate. POMACEAE, 49.	
Leaves opposite, exstipulate. SAXIFRAGACEAE, 51.	
Ovary 1-celled; ovules parietal.	
Fleshy jointed prickly plants; petals many. CACTACEAE, 49.	
Rough-leaved plants; petals 5 or 10. LOACEAE, 59.	
Ovary 1-celled; placenta free, central; pericarp opening by a lid.	
	PORTULACACEAE, 21.
B. Stamens of the same number as the petals and opposite them.	
Pistil solitary; flowers mostly perfect; herbs, shrubs, or woody vines.	
Ovary 1-celled; anthers opening by valves. BERBERIDACEAE, 7.	
Ovary 1-celled; anthers longitudinally dehiscent. PORTULACACEAE, 21	
Ovary 2-4-celled.	
Calyx-lobes small or wanting; petals valvate. VITACEAE, 29.	
Calyx 4-5-cleft valvate in the bud; petals involute. RHAMNACEAE, 29.	
Pistils 3-6, separate; flowers dioecious; woody vines. MENISPERMACEAE, 7.	
C. Stamens of the same number as the petals and alternate with them or not more than twice as many.	
* Ovary superior, the calyx entirely free.	
† Ovaries 2 or more, separate.	
Stamens hypogynous, distinct.	
Leaves pellucid-punctate. RUTACEAE, 27.	
Leaves not pellucid-punctate.	
Tree; leaves odd-pinnate; flowers paniculate. SIMARUBACEAE, 28.	
Herbs; leaves thick, succulent; flowers cymose. CRASSULACEAE, 53.	
Herbs; leaves not fleshy; inflorescence various. RANUNCULACEAE, 1.	
Stamens inserted on the calyx, distinct.	
Stamens twice as many as the pistils. CRASSULACEAE, 53.	
Stamens neither the same nor twice the number of the pistils.	
Leaves stipulate. ROSACEAE, 44.	
Leaves exstipulate. SAXIFRAGACEAE, 51.	

† † *Ovaries 2-5, separate above, more or less united below.*

Leaves pellucid-punctate. RUTACEAE, 27.

Leaves not pellucid-punctate.

Trees or shrubs; leaves opposite, palmately lobed or pinnate; fruit a samara. ACERACEAE, 30.

A small shrub; leaves opposite, 3-foliolate. STAPHYLEACEAE, 31.

† † † *Ovary 5-lobed, 5-celled; style compound.* GERANIACEAE, 26.

† † † *Ovary simple, 1-celled with one parietal placenta.*

Flowers irregular, the upper petal enclosing the others in the bud. PAPILIONACEAE, 33.

Flowers mostly regular, the upper petal enclosed by the lateral in the bud. CAESALPINACEAE, 42.

† † † † *Ovary 1, compound, as shown by the number of cells, placentae, styles, or stigmas.*

Ovary 1-celled.

Corolla irregular, spurred; petals 4; stamens 6. FUMARIACEAE, 9.

Corolla irregular, lower petal spurred; petals and stamens 5.

VIOLACEAE, 17.

Corolla regular or nearly so.

Ovule 1; stigmas 3; small trees or shrubs with resinous or milky acrid juice. ANACARDIACEAE, 32.

Ovules 1 or 2; herbs. A few of the CRUCIFERAE, 10.

Ovules 2 or more, central or basal.

Petals inserted on the throat of the calyx. LYTHRACEAE, 55.

Petals not inserted on the throat of the calyx. CARYOPHYLLACEAE, 19.

Ovules several or many, on two or more parietal placentae.

Leaves pellucid-punctate or black-dotted. HYPERICACEAE, 22.

Leaves non-punctate.

Sepals 5, unequal or only 3. CISTACEAE, 17.

Sepals and petals 4; stamens 6. CRUCIFERAE, 10.

Sepals and petals 5; stamens 5 or 10. SAXIFRAGACEAE, 51.

Ovary 2-several-celled; flowers irregular.

Stamens 6 or 8; anthers 1-celled, opening at the top. POLYGALACEAE, 21.

Stamens 11 or 12, dehiscence longitudinal; petals inserted on the throat of the gibbous or spurred calyx. Cuphea, in LYTHRACEAE, 55.

Stamens 5 to 8 or 10; petals mostly hypogynous.

Ovary 3-celled; leaves opposite, digitate; trees. HIPPOCASTANACEAE, 31.

Ovary 5-celled; leaves alternate, simple; herbs. BALSAMINACEAE, 27.

Ovary 2-several-celled; flowers regular.

Stamens neither the same nor twice the number of the petals.

Petals 5; stamens collected into 3 clusters. HYPERICACEAE, 22.

Petals 4; stamens 6, 2 shorter, rarely 2 or 4. CRUCIFERAE, 10.

Petals 5; stamens more, distinct. ACERACEAE, 30.

Stamens of the same or twice the number of the petals.

Ovules and seeds 1 or 2 in each cell.

Herbs, with perfect symmetrical flowers.

Ovary deeply lobed, 5-celled; sepals 5. GERANIACEAE, 26.

Ovary globose, breaking into 5 2-celled carpels, sepals 5.

LINACEAE, 26.

Shrubs or trees.

Leaves 3-foliolate, pellucid-punctate. RUTACEAE, 27.

Leaves palmately lobed and veined; fruit a 2-winged samara.

ACERACEAE, 30.

Leaves simple, pinnately veined, non punctate.	
Fruit a globose or lobed pod; seeds arillate.	CELASTRACEAE, 28.
Fruit a berry-like drupe.	ILICINEAE, 29.
Ovules and seeds several to many in each cell.	
Stipules caducous; leaves opposite, compound.	STAPHYLEACEAE, 31
Stipules wanting when the leaves are opposite.	
Stamens 10, monodelphous below; leaflets 3, obcordate.	
	OXALIDACEAE, 27.
Stamens distinct, hypogynous.	CARYOPHYLLACEAE, 19.
Stamens distinct, perigynous.	
Styles usually 2, simple, sometimes cohering.	SAXIFRAGACEAE, 51.
Style 1; capsule often 1-celled.	LYTHRACEAE, 55.
	* * <i>Calyx-tube more or less adherent to the ovary.</i>
Ours climbing annuals, with 3-forked tendrils.	CUCURBITACEAE, 59.
Mostly erect herbs, not tendril bearing.	
Ovules and seeds two to many in each cell of the ovary.	
Ovary 1-celled; ovules many, basal.	PORTULACACEAE, 21.
Ovary 1-celled; placentae 2 or 3, parietal.	SAXIFRAGACEAE, 51.
Ovary 2-several-celled.	
Anthers dehiscing by apical pores; style 1.	MELASTOMACEAE, 55.
Anthers not dehiscing by apical pores.	
Stamens inserted on a disk which fills the bottom of the calyx.	
	CELASTRACEAE, 28.
Stamens inserted on the calyx.	
Stamens 4 or 8, rarely 5; style 1.	ONAGRACEAE, 56.
Stamens 5 or 10; styles 2 or 3, distinct.	SAXIFRAGACEAE, 51.
Ovules and seeds solitary in each cell of the ovary.	
Stamens 2 or 8; styles 1; stigma 2-4-lobed; herbs.	ONAGRACEAE, 56.
Stamens 4 or 8; styles or stigmas 4; aquatics.	HALORAGIDACEAE, 54.
Stamens 8, but 4 of them sterile, scale-like, styles 2; small tree.	
	HAMAMELIDACEAE, 54.
Stamens 4; style and stigma 1; small shrubs.	CORNACEAE, 65.
Stamens 5; flowers umbellate, rarely capitate.	
Fruit dry, consisting of 2 coherent carpels; styles 2.	
	UMBELLIFERAE, 60.
Fruit a 2-5-celled drupe; styles 2-5.	ARALIACEAE, 64.
Gamopetalous forms in polypetalous families.	
Forms which have their petals more or less united into one piece.	
* <i>Stamens more numerous than the lobes of the corolla.</i>	
Ovary 1-celled, with one parietal placenta.	
The upper petal enclosing the others in the bud.	PAPILIONACEAE, 33.
The upper petal enclosed by the lateral in the bud.	
	CAESALPINACEAE, 43.
Ovary 2-celled, 2-ovuled.	POLYGALACEAE, 32.
Ovary 3-many-celled.	
Stamens 10, hypogynous, united below; styles 5.	OXALIDACEAE, 27.
Stamens many, monodelphous; styles many.	MALVACEAE, 23.
	* * <i>Stamens as many as the lobes of the ovary.</i>
Annuals, climbing, tendril bearing.	CUCURBITACEAE, 59.
Shrub, with alternate simple leaves.	ILICINEAE, 29.

Apetalous forms in polypetalous families.

Forms having the corolla and sometimes the calyx wanting; calyx often petaloid.

* *Ovary or its cells with many ovules.*

Ovary inferior, 4-celled; stamens 4. *Ludwigia*, in **ONAGRACEAE**, 56.

Ovary inferior, 1-celled; stamens usually 8. *Chrysosplenium*, in **SAXIFRAGACEAE**, 52.

Ovary superior.

Pod 5-celled, 5-beaked, the beaks falling away at maturity; stamens 10. *Penthorum*, in **CRASSULACEAE**, 53.

Pod 3-celled, 3-valved, many-seeded. *AIZOACEAE*, 60.

Pod 1 or 2-celled; placentae central.

Stamens inserted on the calyx. *LYTHRACEAE*, 55.

Stamens hypogynous or inserted at the base of the calyx.

CARYOPHYLLACEAE, 19.

Pod 1-celled, with one parietal placenta. *RANUNCULACEAE*, 1.

Pods 2 or more, separate, simple. *RANUNCULACEAE*, 1.

* * *Ovary or its cells usually with 1 or 2 ovules.*

Pistils 2 or more, distinct or nearly so.

Stamens hypogynous; leaves punctate. *RUTACEAE*, 27.

Stamens hypogynous; leaves not punctate; calyx usually petaloid.

RANUNCULACEAE, 1.

Pistil 1, simple or compound.

Ovary inferior, 3 or 4-celled; aquatics. *HALORAGIDACEAE*, 54.

Ovary naked; calyx none. *Callitrichie*, in **HALORAGIDACEAE**, 55.

Ovary free from the calyx; trees or shrubs.

Ovary 2-celled; fruit a 2-winged samara. *ACERACEAE*, 30.

Ovary 3-celled; fruit drupaceous or dry. *RHAMNACEAE*, 29.

RANUNCULACEAE Juss. CROWFOOT FAMILY.

Annual or perennial herbs, with colorless usually acrid juice; and poly-petalous or apetalous, regular or irregular flowers. Leaves simple or dissected, opposite or alternate; petioles dilated. Sepals 3-15, frequently petaloid. Petals 3-15. Stamens usually many. Fruit dry achenes, follicles, or berries.

* Leaves opposite, terminating in tendrils; sepals 4, petaloid.

CLEMATIS. Woody climbing plants.

** Upper leaves opposite or whorled; peduncles with one apetalous flower.

ANEMONE. involucre foliaceous, remote from the flower.

HEPATICA. involucre close to the flower, calyx-like.

ANEMONELLA. Flowers umbellate.

THALICTRUM. Sepals 4, petaloid or greenish.

*** Sepals usually 5; petals present; achenes many.

RANUNCULUS. Petals yellow, rarely white, with a nectariferous pit or scale at the base inside.

MYOSURUS. Flowers solitary, seapose; petals 5, white.

**** Flowers conspicuous, apetalous, not racemose; sepals petaloid.

CALTHA. Leaves kidney-shaped, undivided; flowers yellow.

ISOPYRUM. Leaves divided; flowers white.

***** Sepals or petals spurred.

AQUILEGIA. Petals produced backward into 5 hollow spurs.

DELPHINIUM. Upper sepal produced backward into a long spur.

***** Flowers regular; fruit a berry.

ACTAEA. Flowers small, in a single short raceme; pistil 1.

HYDRASTIS. Flowers apetalous, solitary; roots yellow.

CLEMATIS L. VIRGIN'S-BOWER. Woody climbing plants, with opposite pinnate leaves, terminating in tendrils; and large purplish flowers. Sepals 4. Petals none. Achenes many, in a globular head, with long persistent styles.

* Flowers cymose-paniculate.

C. virginiana L. Common V. Leaves petioled, of 3 ovate leaflets; leaflets cut or lobed; styles persistent, plumose. A trailing vine, common in low grounds in thickets or along fence-rows; July-Sept.

* Flowers solitary.

C. pitcheri T. & G. Leaflets 3-7, ovate, 1-3-lobed; sepals thin, tips recurved; achenes with filiform, persistent, silky, but not plumose styles. Thickets; June-August; frequent. (*C. simili* Sweet.)

C. viorna L. Leather-flower. Similar to the preceding; persistent styles plumose. This species has been frequently reported but the author has seen no reliable specimens, the so-called specimens not being in fruit their identity was questionable.

ANEMONE L. ANEMONE. WIND-FLOWER. Perennial herbs, with the leaves mostly radical, long-petioled, the few caudine whorled so as to form a foliaceous involucre remote from the flower, all compound or dissected. Peduncles 1-flowered. Sepals 5-20, petal-like. Petals none or in one of abortive stamens. Fruit compressed 1-seeded achenes.

* *Involucre forming a cup; carpels in a globular head, with long persistent plumose styles.*

A. patens nuttalliana Gray. *Pasque-flower.* Stem 4-10 inches high, villous; flowering before leafing; leaves ternately-parted, the divisions dissected into narrow linear lobes; involucral lobes linear; peduncle solitary, lengthening after flowering; flower large; sepals 5-7, ovate, whitish or purplish. High prairies; March-May; once common, becoming scarce as the prairies are broken up. Winneshiek, Allamakee, Fayette, Delaware, Story, Hardin, Emmet, Lyon, Woodbury, Calhoun, Crawford, and Shelby counties. (*Pulsatilla hirsutissima* (Pursh) Britton.)

* * *Styles short, not plumose.*

† *Leaves of the involucre 3, sessile.*

A. pennsylvanica L. Stem 1-2 feet high, hairy; radical leaves 5-7-parted or cleft, divisions cut or toothed toward the apex; primary peduncle naked, two lateral ones with a 2-leaved involucre; sepals 5, obovate, white; achenes in a globose head, flat, nearly orbicular, pubescent. Low places; June-July; common. (*A. canadensis* L.)

†† *Leaves of the involucre long-petioled; sepals 5-8, usually silky beneath.*

A. cylindrica Gray. Stem 1-2 feet high, silky-pubescent; flowers 2-6, on exserted naked peduncles, sometimes one involucellate; involucral leaves 4-18, 3-divided, the divisions cuneate-lanceolate, cleft, toothed toward the apex; head cylindrical, 1 inch long; achenes pubescent. Prairies and woods; June-July; common.

A. virginiana L. Stem 2-3 feet high, pubescent; involucral leaves 3, 3-parted, the divisions ovate-lanceolate, cleft and serrate; the first peduncle naked, the later with a 2-leaved involucre near the middle; sepals 5; head of fruit oval to oblong. Woods; June-August; frequent and widely distributed.

A. quinquefolia L. Stem 4-8 inches high, smooth or slightly pubescent, from horizontal rootstocks; involucral leaves 3, leaflets wedge-shaped, conspicuously toothed, somewhat lobed; sepals 4-7, ovate, white varying to blue or purple. Rich upland woods; April-May; common locally; Winneshiek, Fayette, Scott, Muscatine, Johnson, and Story counties. (*A. nemorosa* L. of Gray's Manual.)

* * * *Involucre far below the flower.*

A. caroliniana Walt. Stem 3-8 inches high, pubescent, from a small tuber; root-leaves 3-parted or cleft; sepals 6-20, linear, purplish varying to whitish. Dry soil, open places; April-May; infrequent; Fayette, Scott, Muscatine, Story, Hardin, Hancock, and Sioux counties.

HEPATICA Scop. Low perennial seapose herbs, with thick heart-shaped 3-lobed radical leaves and solitary flowers. Stamens many; filaments short; anthers 2-celled. Involucre 3-leaved, close to the flower, calyx-like.

H. acutiloba DC. Scapes 4-8 inches high, villous; leaves thick, evergreen, 3-lobed or sometimes 5-lobed; leaf-lobes and those of the involucre acute or acutish; flowers blue, purple, or white. Upland woods; March-April; common in the eastern half of Iowa, but apparently rare in the western portion. (*H. acuta* (Pursh) Britton.)

H. triloba Chaix. Lobes of leaves and involucre rounded or obtuse. A species closely resembling the preceding. It has been reported from Scott county, and various other localities but there is much doubt as to whether it belongs to our flora. (*H. hepatica* (L.) Karst.)

ANEMONELLA Spach. Leaves 2-3-ternately compound; involucral leaves;

similar, sessile; leaflets more or less 3-lobed, rounded to heart-shaped at the base and long petiolate. Flowers white or pinkish, umbellate. Sepals 5-10, large, broad ovate. Achenes terete, ribbed, sessile.

A. thalictroides (L.) Spach. *Rue Anemone*. A low glabrous perennial herb, 3-5 inches high with stem and radical leaves rising from a cluster of tuberous roots. Upland woods; April-May; common. Occasionally double flowered forms are found. (*Syndesmon thalictroides* (L.) Hoffmg.)

THALICTRUM L. MEADOW-RUE. Perennials, with alternate 2-3-ternately compound leaves, the divisions and leaflets stalked; and perfect, polygamous or dioecious, paniculate or racemose flowers. Sepals 4-5, frequently petaloid. Petals none. Stamens many, exserted. Fruit achenes.

T. purpurascens L. *Purple M.* Stem 2-6 feet high, frequently purplish; leaves 3-4-ternate, the caudine nearly sessile; leaflets oblong-ovate to nearly lanceolate, veiny, often waxy beneath, usually with three apical lobes; flowers greenish or purplish, dioecious or polygamous; filaments narrow. Low prairies and woods; May-June; common.

T. polygamum Muhl. *Tall M.* Similar to the preceding; plant not glandular or waxy; filaments broadened. Reported as belonging to our flora.

T. dioicum L. *Early M.* Stem 1-2 feet high, glabrous; leaves 3-4-ternate, petioled; leaflets drooping, 3-9-lobed, rounded; flowers dioecious, purplish or greenish. Rich upland woods and meadows; April-May; frequent; Winnesiek, Allamakee, Clayton, Fayette, Scott, Story, Cerro Gordo, Webster, Dallas, and Dickinson counties.

RANUNCULUS L. CROWFOOT. BUTTERCUP. Annual or perennial herbs, with alternate leaves, and white or yellow flowers. Flowers solitary, sometimes corymbed. Sepals 5, deciduous. Petals 5, rarely more or less, sometimes minute, with a nectariferous pit or scale at the base inside. Achenes many, usually flattened, pointed, capitate or spicate.

* *Aquatics.*

R. trichophyllum Chaix. *White Water C.* Stem about 1 foot long; leaves petioled, flacid, divided into capillary divisions, *collapsing* when withdrawn from the water; petals ovate, twice as long as the calyx, white. Growing in the soft mud in shallow water, immersed except the flower; June-August; infrequent; Winnesiek, Fayette, and Muscatine counties; reported from Hamilton county. (*R. aquatilis* var. *trichophyllum* of Gray's Manual. *Batrachium trichophyllum* (Chaix.) Bossch.)

R. circinatus Sibth. *Stiff Water C.* Similar to the preceding but leaves sessile or nearly so, rigid, *not collapsing*; stipules conspicuous. In similar situations; June-August; infrequent; Fayette, Muscatine, Johnson, and Emmet counties. (*B. divaricatum* (Schrank) Wimm.)

R. multifidus Pursh. *Yellow Water C.* Stems floating or immersed, sometimes emersed; leaves repeatedly 3-forked, the ultimate divisions long, capillary; out of water the leaves are often reniform, lobed or toothed or else the divisions are shorter and linear; petals 5-8, bright yellow. In ponds and slow streams; May-July; infrequent; Fayette, Scott, Muscatine, Johnson, Story, Hardin, Emmett, Hamilton, Decatur, and Lyon counties. (*R. delphinifolius* Torr.)

* * *Terrestrial, but frequently growing in wet places; flowers yellow.*

† *Radical leaves deeply cleft or divided.*

R. fascicularis Muhl. Plant pubescent, low; 3-10 inches high, fibrous roots thickened; leaves 3-5-divided, divisions lobed and cleft, the ultimate segments

oblong or linear; petals 5-7, spatulate-oblong; achenes flat, beaked by a subulate style. Prairies and wooded hillsides; April-May common; Winneshiek, Fayette, Scott, Muscatine, Henry, Johnson, Polk, Mahaska, and Pottawattomie counties.

R. septentrionalis Poir. Low, 6-20 inches high, pubescent, erect or in wet places mostly procumbent and forming runners, roots many, fibrous; leaves petioled, 3-divided; the divisions usually all stalked, 3-cleft or -divided, the segments toothed or cut; achenes marginated, tipped by a sword-shaped style of about their length. Moist soil; April-May; common in all portions of the state.

R. repens L. Habit and foliage closely resembling the preceding; leaves often white-spotted; achenes marginated; the beak stout, short, and slightly bent. Low grounds; May-July; Muscatine and Johnson counties.

R. recurvatus Poir. *Hooked C.* Stem 1-2 feet high, hirsute, leaves all similar, long-petioled, broadly reniform, deeply 3-cleft, the divisions toothed and lobed beyond the middle; flowers small, on long peduncles; calyx reflexed; petals shorter; achenes compressed, tipped by a recurved beak which is half their length. Woods; May-June; Scott, Muscatine, and Johnson counties.

R. pennsylvanicus L. f. *Bristly C.* Annual; stem 1-2 feet high, branching, bristly hairy, leaves ternately compound; divisions frequently 3-cleft, the lobes lanceolate, cuneate, cut or toothed; flowers small; calyx reflexed; head of fruit oblong; achenes tipped by a sharp beak one-third their length. Wet soil; June-August, infrequent; Winneshiek, Allamakee, Scott, Muscatine, Henry, Linn, Story, Emmet, Cerro Gordo, Hancock, Dickinson, Winnebago, and Woodbury counties.

R. hispidus Hook. *Hispid C.* Resembles the preceding; annual or biennial; ascending or declined, hairy or somewhat hispid; stems 1-2 feet long, rarely rooting; leaves 3-divided, leaflets petiolate, ovate or broadly oblong, cuneate, mostly 3-parted or -cleft, or variously lobed or cleft, somewhat toothed; head of fruit oblong; achenes smooth, the sharp straight beak about one-fourth their length. This species has been confused with *R. pennsylvanicus* L. and *R. septentrionalis* Poir.; probably frequent; Fayette county. (*R. macounii* Britton.)

R. bulbosus L. *Bulbous C.* Stem about 1 foot high, from a bulbous base; radical leaves 3-divided, lateral divisions sessile, the terminal stalked and 3-parted, all more or less cleft and toothed; calyx reflexed; petals much longer; head of fruit globose; achenes compressed, short beaked. Fields and waste places; May-July; reported as an Iowa weed.

R. acris L. *Tall C.* Stem 2-3 feet high, hairy; leaves of 3 sessile divisions, the basal 3-7-divided, the divisions 3-cleft or -parted, the segments cut into narrow or linear lobes; petals obovate, 2-3 times longer than the calyx; head of fruit globose; achenes compressed, short beaked. Fields and waste places; June-August; infrequent; Jones, Story, and Page counties.

† *Root-leaves frequently undivided; roundish, sometimes lobed or cleft.*

R. abortivus L. *Small flowered C.* Biennial, conspicuous by having the primary root-leaves round, heart- or kidney-shaped, obscurely crenate and long-petioled, other leaves 3-5-lobed or -parted and variously toothed, petiolated or nearly sessile; flowers small, inconspicuous, pale yellow; petals shorter than the reflexed sepals. Very common in moist places in meadows and woods; April-June.

R. sceleratus L. *Cursed C.* Annual; stem 6-20 inches high, glabrous, thick, hollow, with acrid juice; root-leaves of 3-5 rounded lobes, others 3-parted, cut

and toothed, the upper nearly sessile, deeply lobed or divided; lobes oblong or linear, obtuse, entire or toothed; petals about as long as the sepals, pale yellow; head of fruit oblong or cylindric; achenes mucronulate. Wet ditches; June-August; frequent; Scott, Emmet, and Calhoun counties.

R. rhomboideus Goldie. *Prairie C.* Stem 4-16 inches high, hairy, some branched; root-leaves roundish to rhombic-ovate, toothed or crenate, others 3-5-lobed or -parted, the upper sessile or nearly so; petals large, deep yellow; head of fruit spherical; achenes orbicular, minutely beaked. Prairies; April-May; frequent; Winneshiek, Fayette, Emmet, Lyon, and Calhoun counties. (*R. ovalis* Raf.)

R. cymbalaria Pursh. *Sea-side C.* Low, smooth, spreading by long root-ing runners, leaves clustered at the roots and on the joints of the runners, long-petioled, cordate or kidney-shaped, crenate; scapes 1-several flowered, sometimes leaf bearing toward the base; petals sometimes as many as 8. Dry prairies and sandy shores; June-August; infrequent; Story, Dickinson, Emmet, Sioux, and Lyon counties. (*Oxygraphis cymbalaria* (Pursh.) Prantl.)

R. affinis R. Br. A small hairy or glabrous plant, from 4-10 inches high; flowers small, pale yellow; root-leaves pedately cleft, stem leaves with nar-row oblanceolate divisions; heads oblong. Reported from Iowa. (*R. pedatifidus* J. E. Smith.)

MYOSURUS Dill. Small annual herbs, with linear basal leaves, and 1-flowered scapes. Sepals 5, spurred. Petals small, narrow. Stamens usually many. Pistils numerous.

M. minimus L. *Mouse-tail.* Low, 1-6 inches high, glabrous: roots fibrous; leaves tufted, entire; achenes numerous, on an elongated receptacle, glabrous, apiculate. Alluvial soil; April-July; Muscatine county, reported from Scott county.

CALTHA L. Glabrous perennial succulent herbs, with orbicular or kidney-shaped leaves, and conspicuous flowers. Sepals 5-9, petaloid, deciduous. Petals none. Stamens many. Pistils 5-10; styles obscure. Pods compressed, spreading, bearing the many seeds in two rows along the ventral suture.

C. palustris L. *Marsh Marigold.* Stems 1-2 feet high, hollow, grooved, stout; basal leaves long-petioled, cordate or reniform, with a narrow sinus, entire or crenate, the upper with shorter petioles and more or less truncate bases; sepals oval, obtuse, yellow. Swamps, banks of streams; April-May; frequent; Winneshiek, Fayette, Scott, Muscatine, Johnson, Story, Emmet, Dickinson, and Woodbury counties.

ISOPYRUM L. Smooth perennial herbs, with ternately decompound leaves, and axillary or terminal long-peduncled flowers. Sepals 5, petaloid, deciduous. Petals in ours none. Stamens many. Pistils usually 4. Pod o-vate or oblong, sessile, 2-several seeded.

I. bitemnatum (Raf.) T. & G. Roots many, fibrous, occasionally thickened into small tubers. Moist woods; May; common; Winneshiek, Fayette, Scott, Muscatine, Henry, Johnson, Story, Emmet, Decatur, and Calhoun coun-ties.

AQUILEGIA L. Perennial herbs, with ternately compound long-petioled leaves, and showy flowers. Sepals 5, petaloid. Petals 5, prolonged back-ward into long hollow spurs. Stamens numerous, exserted. Pistils 5.

A. canadensis L. *Wild Columbine.* Stem 1-3 feet high, branched; leaflets lobed; flowers solitary, large, scarlet, nodding, spurs pointing upward; pods erect. Woodlands; May-June; common throughout.

DELPHINIUM L. LARKSPUR. Herbs, with palmately cut or divided leaves, and racemose flowers. Sepals 5, upper one prolonged into a spur, petal-like. Petals irregular 4 or 2, upper pair prolonged back into the spur of the calyx. Pistils becoming many seeded pods in fruit.

* *Perennials; leaves long-petioled; pistils 3.*

D. tricorne Mx. *Dwarf L.* Stem simple, hollow, 1-3 feet high, glabrous or pubescent; roots a cluster of small tubers; leaves about 5-parted, divisions 2-3-cleft; raceme open; flowers blue or whitish; spur ascending, nearly straight; pods diverging. Prairies and rich woods; May; frequent; Decatur, Union, Clark, Pottawattomie, Mahaska, and Shelby counties.

D. azureum Mx. *Field L.* Stem slender, 1-3 feet high, nearly solid, more or less pubescent; leaves 3-5-parted, the divisions cleft into linear segments; raceme strict; flowers blue to whitish; pods erect. Prairies; June; common and widely distributed. (*D. carolinianum* Walt.)

D. exaltatum Ait. Raceme narrow, elongated, many-flowered; pods erect. Reported; so-called specimens proved to be *D. azureum* Mx. (*D. urceolatum* Jac.)

* * *Annuals, escapes; petals 2, pistil 1.*

D. coccineum L. Leaves nearly sessile; the divisions narrow, numerous; flowers numerous; spur long and narrow; pods erect, pubescent. Sparingly escaped from gardens; Fayette and Johnson counties.

D. consolida L. *Field L.* Differs from the above by its glabrous pods, longer and slightly bent spurs, and shorter and more open racemes. Reported as an escape in Adams and Mahaska counties.

ACTAEA L. BANEERRY. COHOSH. Perennial herbs, 2-4 feet high, with 2-3-ternately compound leaves, leaflets sharply cleft and toothed, and racemose flowers. Sepals 5, white, deciduous. Petals 4-10. Stamens numerous. Pistil 1. Fruit a globular many-seeded berry.

A. rubra (Ait.) Willd. *Red B.* Stem 1-2 feet high, bushy, raceme ovate; petals spatulate, shorter than the stamens, pedicels slender; berries red. Rich woods; April-May; infrequent; Winneshiek, Fayette, Muscatine, Johnson, Story, Shelby, Emmet, Winnebago, Pottawattomie, and Woodbury counties. (*A. spicata* var. *rubra* Ait.)

A. alba (L.) Mill. *White B.* Resembles the preceding in general appearance; flowers appear 2-3 weeks later; raceme oblong, petals slender; pedicels usually red, thickened in fruit; berries white. Rich woods; April-June; frequent; Winneshiek, Fayette, Scott, Muscatine, Johnson, Henry, Story, Emmet, Floyd, Winnebago, and, Decatur counties.

HYDRASTIS Ellis. Low vernal perennial plants, from thick yellow rootstocks, with one radical leaf, and a hairy stem which is two-leaved above and terminated by a solitary greenish-white flower. Sepals 3, soon falling. Petals none. Stamens numerous. Pistils 12 or more. Fruit 1-2 seeded crimson berries.

H. canadensis L. *Orange-root. Golden Seal.* Stem about 1-foot high, erect; leaves rounded, 4-9-inches wide, 5-7-lobed, doubly serrate, veiny, base cordate, rootstock contains a yellow dye. Rich woods; April; rather rare; Winneshiek, Fayette, and Muscatine counties; reported from Lee county.

ANONACEAE DC. CUSTARD-APPLE FAMILY.

Trees or shrubs, with alternate entire exstipulate leaves, and solitary axillary flowers. Sepals 3, valvate in our species. Petals about 6, in 2 rows, thickish, valvate in the bud, hypogynous. Stamens many; anthers adnate, extrorse. Represented in our flora by a single species of the ge-

nus ASIMINA Adans.

A. trioba (L.) Dunal. *Common Papaw*. A small tree, 10-30 feet high; shoots and young leaves rusty pubescent, becoming glabrous; leaves obovate-lanceolate, thin, acute, 6-12 inches long, very short-petioled, base cuneate; flowers appearing with the leaves, on shoots of the preceding year; peduncles and ovate sepals dark-pubescent; petals dull purple, the outer much longer than the calyx; fruit a fleshy yellowish edible berry. Borders of rivers; flowers in April; fruit edible, ripe in October; infrequent; Clayton, Dubuque, Louisa, Des Moines, Lee, Johnson, and Fremont counties.

MENISPERMACEAE DC. MOONSEED FAMILY.

Climbing woody plants, with alternate leaves, and small dioecious panicled flowers. Sepals and petals similar. Fruit a 1-seeded drupe.

MENISPERMUM L. **MOONSEED**. Vine pubescent. Leaves long-petioled, large, entire or 3-7-lobed, palmately veined, downy beneath, flowers small, white, on long axillary peduncles, panicled. Sepals 4-8. Petals 6-8. Stamens 12-24; anthers 4-celled. Pistils 2-4. Drupe globular, black.

M. canadense L. A common vine found in all parts of the state in rich woodlands. The flowers appear from the last of May until the end of July. Fruit ripe in September.

BERBERIDACEAE T. & G. BARBERRY FAMILY.

Perennial herbs or shrubs, with alternate stipulate or exstipulate leaves, and regular perfect flowers. Sepals and petals imbricated in the bud, usually in two rows of three each. Pistil single. Fruit a berry or capsule.

PODOPHYLLUM. Flowers large, white; fruit a large berry.

CAULOPHYLLUM. Flowers greenish; the ovary soon bursting and exposing 2 naked seeds.

PODOPHYLLUM L. Herbs, with long running rootstocks, and 2 large peltate 1-sided 5-9-parted leaves, the divisions variously lobed and toothed. Flowers 1-2, perfect, nodding, white, 1-2 inches across, in fork of 2 leaves; flower bud with 3 green early deciduous bractlets. Petals 6-9. Stamens 12-18. Fruit a large many seeded berry.

P. peltatum L. *May Apple*. Plant 1-2 feet high; common in rich woodlands; flowers in May; fruit ripe in July; then the plant decays. Winneshiek, Allamakee, Clayton, Dubuque, Fayette, Scott, Muscatine, Henry, Johnson, Story, Appanoose, Decatur, Ringgold, Union, and Page counties.

CAULOPHYLLUM Mx. Peduncles 2-3 inches long; pedicels a little longer than the flower. Flowers paniculate, yellowish-green. Calyx petal-like, with 3 or 4 small lance-linear bracts; sepals 6, ovate. Petals 6, small, opposite, gland-like, thick. Stamens opposite, 6; anthers large, oblong, 2-celled; filaments short. Style short, stigma small.

C. thalictroides (L.) Mx. *Blue Cohosh*. Stem 1-2 feet high, glabrous, green, glaucous when young, with 2 or 3 large sheathing bracts at the base, from thick matted rootstocks; leaves 3-ternately compound, one near the summit and usually one near the base of the panicle; leaflets wedge-ovate, 3-cleft, middle division frequently with 3 large teeth; seeds the size of a grape, deep blue, drupe-like. Rich woods; April-May; frequent; Winneshiek, Allamakee, Clayton, Dubuque, Fayette, Scott, Muscatine, Johnson, Story, Emmet, Winnebago, Cerro Gordo, Woodbury, Shelby, and Decatur counties.

NYMPHAEACEAE DC. WATER LILY FAMILY.

Aquatic perennial herbs, with horizontal rootstocks; peltate or cordate, floating, immersed or emersed leaves; and solitary axillary flowers. Flowers showy, regular. Sepals 3-5. Petals and stamens many in most of

our species. Fruit indehiscent. Seeds enclosed in pulpy arils or naked.

BRASENIA. Sepals and petals 3; stamens 12-18; leaves peltate.

NELUMBO. Sepals about 4-5; petals numerous; carpels 1-ovuled, separately immersed in the top of an oboconical receptacle.

NYMPHAEA. Petals large, adnate to the ovary; stamens from the summit of the ovary.

NUPHAR. Petals small, stamen-like; stamens hypogynous.

BRASENIA Schreber. Stems branching, slender, lengthy, from creeping rootstocks. Leaves alternate, oval, centrally peltate, palmately veined, long-petioled, floating. Carpels 4-18, separate, indehiscent, 1-2-seeded.

B. peltata Pursh. Leaves oval, entire, 1-3 feet across; flowers small, dull-purple, long-peduncled; fruit oblong. Ponds; rare; Muscatine and Story counties. (*B. purpurea* (Mx.) Casp.)

NELUMBO Adans. Rootstock tuberous. Leaves centrally peltate. Flowers very large. Sepals 4-6. Petals many, in several rows. Stamens indefinite. Sepals, petals, and stamens passing gradually into each other. Petals and stamens inserted on the calyx, caducous. Carpels many, distinct, contained in pits in the large convex top-shaped receptacle.

N. lutea (Willd.) Pers. *Yellow Nelumbo*. Leaves much above water, large, with a cupped or depressed center or else floating and plane, circular, 1-2 feet in diameter; flowers pale yellow, 5-10 inches broad; tubers and seed edible. Sloughs of the Mississippi and Missouri rivers and interior lakes; July-August; frequent; Allamakee, Clayton, Muscatine, Louisa, Des Moines, Henry, Iowa, and Monona counties.

NYMPHAEA L. **WATER LILY.** Flowers large, white or pinkish. Sepals 4-5, green outwardly. Petals numerous, in many rows, gradually passing into the stamens. Stamens very numerous, inserted on the ovary. Ovary 12-3-celled. Fruit depressed globular, covered with the bases of decaying petals, maturing under water.

N. odorata Ait. *Sweet-scented W. L.* Rootstock with a few persistent branches; leaves orbicular, entire, cleft at the base to the insertion of the petiole, usually purplish beneath; stipules broadly triangular to kidney-shaped, notched at the apex; flowers usually white, sometimes pinkish, *very fragrant*, large, frequently 6 inches in diameter, opening in the morning and closing in the afternoon; petals narrowly oblong, obtuse. Ponds; June-September; infrequent; range rather uncertain as it has been confused with the following species. (*Castalia odorata* (Dryand.) W. & W.)

N. reniformis D. C. *Tuber-bearing W. L.* Rootstock with numerous detachable tubers by means of which the plant propagates; leaves reinform, orbicular, larger than the preceding, 8-15 inches wide, green both sides, ribs prominent; flowers very large, *scentless* or nearly so, white; petals oblong, broader than those of the preceding species. Ponds; July-September; infrequent; widely distributed; Muscatine, Linn, Story, Hamilton, Cerro Gordo, Winnebago, Hancock, Lyon, Emmet, and Fremont counties. (*C. tuberosa* (Paine) Greene.)

NUPHAR Smith. **YELLOW POND LILY.** Rootstock creeping, cylindrical, flowers yellow. Sepals 5 or 6, greenish outward, roundish or concave. Petals numerous, small, thick, stamen-like or scale-like. Stamens numerous, short, inserted with the petals on the receptacle; stigmas united into a radiate disc. Fruit ovoid, naked, usually ripening above water.

N. advena Ait. f. Leaves floating, emersed or erect, thick, orbicular, entire, palmately veined, base deeply heart-shaped; sepals 6, oblong,

unequal; petals shorter than the stamens, resembling them; stigmatic disc undulate or nearly entire, pale red, 12-24 rayed. Ponds and slow streams; May-August; frequent; Winneshiek, Allamakee, Fayette, Scott, Muscatine, Johnson, Linn, Story, Hamilton, Cerro Gordo, Winnebago, Dickinson, Emmet, and Lyon counties. (*Nymphaea advena* Sol.)

SARRACENIACEAE *La Pyl.* PITCHER-PLANT FAMILY.

Marsh plants, with hollow pitcher-shaped or trumpet-shaped leaves, and scapose nodding flowers. The principal genus of the order is **SARRACENIA** L.

S. purpurea L. *Pitcher-plant. Side-saddle Flower.* Leaves ascending, curved, broadly winged; hood erect, open, round heart-shaped: scapes 10-20 inches high, bearing a solitary deep purple flower; calyx of 5 sepals with 3 bractlets at the base; petals 5, obovate. Bogs; May-June; reported from N. E. Iowa (Gray's Manual) and also from Scott county (Nagel and Haupt.). W. D. Barnes of Blue Grass thinks the latter locality is a mistake as there is no specimen in the collection of the Davenport Academy of Sciences and the species has not been found in the vicinity after thorough search.

PAPAVERACEAE *B. Juss.* POPPY FAMILY.

Herbs, with milky or colored acrid juice, alternate exstipulate leaves, and long peduncled solitary regular flowers. Sepals 2, early deciduous. Petals usually 4, imbricated, deciduous. Stamens 16-24. Ovary usually 1-celled, many-ovuled; style short or none; stigmas 1 or 2. Pods 2-valved, 1-celled, many seeded.

SANGUINARIA. Juice red; flowers on scapes, white.

ARGEMONE. Juice yellow; leaves spiny-toothed.

SANGUINARIA L. Flowers white. Petals 8-12, spatulate-oblong. Stamens numerous. Stigma 2-grooved. Pod oblong, dehiscent, 1-celled, 2-valved, many seeded.

S. canadensis L. *Bloodroot.* A low perennial; rootstock horizontal, large, with a red juice; leaf solitary, long petioled, kidney-shaped, palmately lobed, the lobes repand or cleft at the apex. Rich woods; flowers mostly in April, fruits in June; frequent.

ARGEMONE L. **PRICKLY POPPY.** Annual or biennial herbs, with yellow sap, sessile sinuate-lobed prickly-toothed leaves, and large showy flowers. Sepals 2-3. Petals 4-6. Style short; stigmas 3-6, radiate. Pod oblong, prickly, opening at the apex by 3-6 valves. Seeds numerous, crested.

A. mexicana L. Whole plant setose-prickly; stem 1-2 feet high, simple or somewhat branched; leaves blotched; petals *yellow*. Waste places; infrequent; Muscatine county.

A. alba Lestib. Similar to the preceding; leaves glaucous or green; petals *white*. Waste places; infrequent; Johnson and Wapello counties.

FUMARIACEAE *DC.* FUMITORY FAMILY.

Smooth delicate herbs, with watery juice, delicate alternate exstipulate compound dissected leaves, and irregular flowers. Sepals 2, minute. Corolla flattened; petals 4, in 2 pairs, outer pair with spreading tips one or both saccate or spurred at base, inner pair narrow, their tips united over the stigma. Stamens 6, in 2 equal sets; the sets opposite the outer petals. Pod 1-celled, in our species deciduous by 2 valves, with 2 parietal placentæ, several-seeded. Often placed in the preceding order.

DICENTRA. Corolla cordate or 2-spurred at the base.

CORYDALIS. Corolla 1-spurred; flowers large, yellow.

DICENTRA Borkh. Low stemless perennials with ternately compound and dissected leaves, and racemose nodding flowers. Pedicels 2-bracted. Petals slightly cohering. Stigma 2-crested.

D. cucullaria DC. *Dutchman's Breeches.* Plant from a scaly bulb of grain-like tubers; leaf-lobes linear; flowers 5-8, white, on a scape, alternate, pedicelled; the 2 outer sepals with their divergent spurs longer than the pedicels. Rich woods; April-May; common, (*Bicuculla cucullaria* (L.) Millsp.)

D. canadensis DC. *Squirrel Corn.* Leaves similar to the preceding; roots with yellow grain-like tubers resembling corn whence the name; flowers 4-7, short pedicelled, greenish-white with a purplish tinge; spurs short, rounded. Woods; May; rare; Winneshiek and Fayette counties. (*B. canadensis* (Goldie) Millsp.)

CORYDALIS Vent. Pale or glaucous leafy-stemmed biennials, with basal and caudine decomound leaves, and racemose flowers. Petals erect-convenient, deciduous, one of the outer pair spurred. Style dilated or lobed, persistent. Pod linear or oblong, with many crested seeds.

C. micrantha Gray. Much branched, diffuse or spreading; corolla pale yellow; spur short, the crest entire or flowers very small and cleistogamous; pods ascending, torulose, short pedicelled; seeds obtuse-margined, smooth. Sandy soil; July; local; Muscatine, Lee, Linn, Winneshiek, Calhoun, and Hardin counties. (*Capnoidea micranthum* (Engelm.) Britton.)

C. curvisiliqua Engelm. Stem 6-15 inches high, branched, more or less rigid; flowers spicate, bright yellow, spur conspicuous; pods short-pedicelled, curved upward, somewhat 4-sided. Sandy soil; April-June; frequent; Muscatine and Henry counties, reported from Page county. (*C. curvisiliquum* (Engelm.) Kuntze.)

CRUCIFERAE B. Juss. MUSTARD FAMILY.

Herbs, with a pungent watery juice, alternate exstipulate leaves, and corymbose or racemose flowers. Sepals 4, deciduous, persistent in Alyssum. Petals 4, hypogynous placed opposite in pairs, thus forming a cross. Stamens 6, 2 in Lepidium, 2 shorter and inserted lower down. Pods 2-celled, rarely 1-celled, linear, oblong, or short, dehiscent by 2 valves, except in Raphanus. Seeds in one or two rows, oblong, ovoid, or globular, sometimes wing-margined. The determinative characters of this order depend largely upon the pods and seed.

* Pod short, flattened contrary to the narrow partition; flowers white.

CAPSELLA. Pod obcordate, triangular, wingless, several seeded.

LEPIDIUM. Pod flat, oval, 2 seeded; stamens 2.

THLASPI. Pod obovate or obcordate, winged, several seeded.

* * Pod linear, sometimes short, terete, turgid, or 4-angled; seed wingless.

NASTURTIUM. Pod oblong to short linear, valves strongly convex, nerveless; seeds in 2 rows; flowers white or yellow.

BARBARA. Pod linear, terete, obscurely 4-angled; seeds in one row; flowers yellow.

ERYSIMUM. Pod 4-angled, valves with prominent veins; stigma 2-lobed; flowers yellow.

SISYMBRIUM. Pod slender, short-pointed, teretish or angled, valves 1-3-nerved; flowers small, yellow or white.

THELYPODIUM. Pod terete, valves 1-nerved; flowers large, purplish.

BRASSICA. Pod with a long stout beak; seeds globose.

HESPERIS. Pod terete, long; flowers large, purple.

* * * Pod compressed parallel to the broad partition; seeds flat or flattish, orbicular or oval, mostly wingless.

ARABIS. Pod flat, long-linear; seeds winged or wingless; flowers white or purple.

DRABA. Pod oval to narrowly lanceolate, flat; flowers racemose.

DENTARIA. Stem simple, mostly naked.

CARDAMINE. Stem leafy; pod linear.

ALYSSUM. Pod orbicular, thin margined. 4 seeded.

C. MELINA. Pod pear-shaped, seeds numerous; flowers yellow.

* * * * *Pod indehiscent.*

R. PHANUS. Pod elongated, long pointed, constricted; seeds cushioned.

CAPSSELLA Medic. An erect annual herb, with a long descending root-stock, clustered pinnatifid or toothed root-leaves, the caudine sessile, saggitate, and small white racemose flowers. Pods obcordate, many-seeded, long pedicelled.

C. bursa-pastoris (L.) Moench. *Shepherd's Purse.* Stem 4-20 inches high, pubescent below, more or less glabrous above. Fields and waste places; April-October; a very common weed. (*Bursa bursa-pastoris* (L) Britton.)

LEPIDIUM L. Annual or biennial herbs with pinnatifid, lobed, or entire leaves and small white or whitish racemose flowers. Stamens 2 in our species. Pods roundish, flat, notched above, 1 seed in each cell. Weeds, commonly known as pepperwort or peppergrass.

L. virginicum L. *Wild P.* Plant leafy, somewhat branched; stem 6-20 inches high; leaves cut-serrate. Petals usually present; pods marginless or nearly so, on slender pedicels; cotyledons accumbent. Fields and waste places, preferring moist shady places; May-October; common.

L. intermedium Gray. Similar to the preceding but stem less leafy and more bushy-branched, nearly entire; petals minute or wanting; pods wing-margined at the top; cotyledons incumbent. Dry or sterile soil, fields and pastures; May-September; very common. (*L. apetalum* Willd.)

THLASPI L. Low herbs, with undivided leaves, the basal forming a rosette, those of the stem auriculate, clasping, and small white or purplish racemose flowers.

T. arvense L. *Field Penny-cress.* Annual, 6-18 inches high, smooth, simple or branched above; basal leaves petioled, oblanceolate, early deciduous, stem leaves oblong or lanceolate, remotely dentate; flowers white; pods flat, nearly orbicular, broadly winged, notched at the apex; seeds about 6 in each cell. Waste places; rare; Muscatine county.

NASTURTIUM R. Br. **WATER CRESS.** Glabrous, usually marsh or aquatic plants, with deeply incised or pinnatifid leaves, and white or yellow flowers. Pods oblong-linear to almost globular, terete or teretish, with convex nerveless valves. Seeds in 2 imperfect rows, marginless.

* Annual or biennial; roots simple, fibrous; flowers small, yellow or yellowish.

N. palustre D C. *Marsh C.* Plant 1-3 feet high, erect, simple or much branched, usually smooth; leaves oblong-lanceolate, pinnately cleft or parted; pedicels about one-fourth inch long; pods erect, shorter than the pedicels, ovoid or oblong. Shallow water or moist depressions; June-September; common. (*Roripa palustris* (L) Bess.)

N. hispidum D C. Similar to the preceding; stem stouter, often 4 feet high, hirsute; leaves lyrate-pinnatifid, hirsute on the veins beneath; pedicels slender, spreading, longer than the ovoid or globose pod. Wet places; July; reported from Scott county. (*R. hispida* (Desv.) Britton.)

N. sessiliflorum Nutt. Stem erect, simple, 1-2 feet high; leaves petioled, obovate or oblong, obtusely incised, crenate, or nearly entire; flowers small, nearly sessile; pods about one-half inch long or less, thick, pedicelled.

Wet places: April-July; infrequent; Clinton, Muscatine, Story, Van Buren, Decatur, and Page counties. (*R. scsilliflora* (Nutt.) A. S. H.)

N. obtusum Nutt. Stem much branched, diffusely spreading; leaves pinnately parted or divided; flowers very small on short pedicels; pods longer than the pedicels, varying from linear-oblong to short-oval. Moist places; April-August; infrequent; Scott, Johnson, and Decatur counties. (*R. obtusa* (Nutt.) Britt.)

* * *Perennial; flowers white or yellow, usually large and showy; leaves undivided or pinnatifid.*

† *Flowers white.*

N. armoracia (L.) Fries. *Horseradish.* Stem erect, 2-3 feet high, from a large descending root; root-leaves long-petioled, very large, oblong, crenate, sinuate or sometimes pinnatifid; caudine leaves oblong-ovate to lanceolate, sessile, dentate or crenate; pods globular, or oblong, pedicels erect, many times longer than the pod; style short. Frequently found near old building sites and about gardens; May-June; infrequent; fruit rarely found. (*R. armoracia* (L.) A. S. H.)

N. lacustre Gray. *Lake Cress.* Aquatic; stem 1-2 feet long, branched, immersed leaves dissected into many filiform divisions, emersed leaves oblong, obtuse or acute, entire, serrate, lobed, or pinnatifid; pedicels slender, widely spreading; petals longer than the sepals; pods ovoid, 1-celled. Ponds and streams; July-August; infrequent; local. Clinton and Muscatine counties. (*R. americana* (Gray) Britton.)

N. officinale R. Br. *True W. C.* Stem spreading, rooting; leaves pinnate; leaflets 3-11, nearly entire, rounded to oblong; petals twice the length of the calyx; pods linear, about an inch long, pedicels slender, widely divergent. In water or wet places; April-August; rather rare; Winneshiek, Fayette, Story, and Page counties.

† † *Flowers yellow.*

N. sinuatum Nutt. Plant low, decumbent, some branched; leaves oblong, pinnately cleft, divisions linear or oblong, entire or sparingly dentate; pods linear-oblong, slightly curved, slender pedicelled; styles slender. Mississippi and Missouri river bottoms; June-September; common; Scott, Henry, Page, Pottawattomie, and Fremont counties. (*R. sinuata* (Nutt.) A. S. H.)

BARBAREA R. Br. *Winter Cress.* Pods linear-terete, obscurely 4-sided; seeds marginless, one row in each cell.

B. vu'garis R. Br. *Yellow Rocket.* Stems tufted, 1-2 feet high; lower leaves petioled; pinnatifid, the divisions oval or obovate, repand-toothed or entire, the terminal division much larger than the lateral ones; caudine leaves usually sessile, sometimes clasping by an auricled base, obovate, cut-toothed or pinnatifid; pods half-inch long; pedicels one-third the length of the pods, erect or spreading. Fields and waste places; May-June; infrequent; Jones, Johnson, Story, Boone, and Shelby counties. (*B. barbara* (L.) Mac M.)

ERYSIMUM L. Mostly biennials, with entire, toothed, or lobed leaves, and small yellow flowers. Pods 4-angled, small, linear; valves keeled by a prominent vein. Seeds marginless, oblong, in 1 row.

E. cheiranthoides L. *Worm-seed Mustard.* Stem 1-2 feet high, slender, simple, erect; leaves narrowly lanceolate, entire or scarcely toothed; pods about an inch long; pedicels scarcely shorter, divergent; pod and pedicels angled to each other. Woods; June-August; common.

E. asperum DC. *Western Wall-flower.* Lower leaves lanceolate or linear,

somewhat petioled, dentate or entire, the upper sessile, entire or toothed; flowers large; pedicels short, stout; pods elongated. Waste places; has been collected near Ames, Story county; introduced.

SISYMBRIUM L. MUSTARD. Pubescent annuals or biennials, with variously pinnatifid leaves, and small white or yellow flowers. Pods elongated, terete or flattish. Seeds oblong, in 1-2 rows.

S. officinale (L.) Scop. *Hedge M.* Stem 1-3 feet high, erect, slender, mostly simple; leaves runcinate-pinnatifid, the lobes crenate, dentate, or nearly entire; pods small, pointed, appressed to the stem, constricted, nearly sessile. Waste places; May-September; common.

S. canescens Nutt. Whole plant densely canescent; stem 1-2 feet high, branched; leaves twice pinnatifid, divisions small, toothed or entire, obtuse; pods shorter than their horizontal slender pedicels, in long open racemes, oblong, linear, or club-shaped; seeds in 2 rows in each cell. Rocky or dry soil; May-July; rather frequent and widely distributed. (*Sophia pinnata* (Walt.) Britton.)

S. sophia L. Similar to the preceding; pods slender, ascending; seeds in 1 row in each cell. Reported from Scott county. (*Sophia sophia* (L.) Britton.)

S. altissimum L. *Tumbling M.* Stem erect, 2-4 feet high, branched, glabrous; lower leaves petioled, runcinate-pinnatifid, the upper leaves short petioled, pinnatifid, the segments linear or lanceolate, dentate or entire, the uppermost leaves linear, bract-like; flowers yellowish; pedicels short, spreading; pods narrowly linear, 3-4 inches long. Waste places along the railway; June-September; infrequent; Allamakee, Clayton, Dubuque, Scott, Clay, and Story counties.

THELYPODIUM Endl. A glabrous perennial herb, with root leaves and lower ones lyrate-pinnatifid, the stem leaves ovate or ovate-lanceolate, tapering both ways, sessile, auricled, or the lower short-petioled, sharply and sometimes doubly toothed, and large purplish flowers. Pods terete, an inch long, on short divergent pedicels; valves nerveless. Seeds in one row, oblong, marginless.

T. pinnatifidum Watson. Stem 1-3 feet high. Frequent in low woods; May-June; Winneshiek, Fayette, Muscatine, Johnson, Story, and Cerro Gordo counties. (*Iodanthus pinnatifidus* (Mx.) Steud.)

BRASSICA L. MUSTARD. Introduced weeds, annual or biennial, with opposite, incised or lyrate-pinnatifid leaves, and racemose yellow flowers. Pods linear and nearly terete or 4-sided, with a long 1-seeded beak, valves 1-5 nerved. Seeds in 1 row in each cell. Style persistent. Fields and waste places.

B. nigra (L.) Koch. *Black M.* Stem 2-6 feet high, erect, branched; lower leaves long-petioled, with a large terminal lobe and 2 or more lateral ones, dentate, somewhat spiny pubescent; flowers in a large terminal raceme; pods slender, appressed. June-August; very common.

B. sinapistrum Boiss. *Wild M. English Charlot.* Leaves similar to the preceding but less pinnatifid, upper leaves scarcely toothed; pods knotted, armed with a long 2-edged beak; valves strongly 1-nerved. May-September; frequent. (*B. arvensis* (L.) B. S. P.)

B. alba Boiss. *White M.* Lower leaves obovate, deeply pinnatifid, the upper lanceolate or oblong, dentate; pods bristly, ascending, beak sword-shaped, as long as the pod, 1-seeded. Rather rare; reported from Muscatine, Story, and Decatur counties. (*Snapsis alba* L.)

B. campestris L. *Turnip*. Sometimes persists for a year or two as an escape near fields where the species was cultivated.

HESPERIS L. Biennial or perennial herbs, with simple, sessile, or petioled, ovate or ovate-lanceolate toothed leaves, and large racemose purple or white flowers. Pods spreading, linear, cylindrical. Seeds oblong, marginless, in 1 row. Stigma erect, lobed.

H. matronalis L. *Dane's Violet*. Stem 2-3 feet high, simple or somewhat branched; pods 2-4 inches long. An infrequent escape from gardens; reported from Fayette and Story counties.

Arabis L. *Rock Cress*. Annual or perennial herbs, with undivided or pinnatifid leaves, and white or purple flowers. Pods elongated, flattened parallel to the partition; valves 1-3-nerved. Style short. Seeds usually margined or winged, in 1 row or in 2 indistinct rows.

* *Flowers small, whitish; pods recurved; seeds broadly winged.*

A. canadensis L. *Sickle-pod*. Stem 2-3 feet high, erect, mostly simple, smooth; stem leaves sessile, pubescent, pointed at both ends, oblong-lanceolate, obscurely veined, lower remotely toothed; petals twice the length of the calyx; pods narrow, 4-6 inches long, scythe-shaped, pendulous; pedicels one-half inch long, rough hairy. Woods; June-August; infrequent but well distributed; Winneshiek, Allamakee, Clayton, Scott, Fayette, Henry, Johnson, Story, Cerro Gordo, Webster, Decatur, and Page counties.

A. laevigata (Muhl.) Poir. *Smooth R.* Glabrous, glaucous, stem 1-3 feet high, erect; basal leaves spatulate or obovate, dentate, petioled; stem leaves sagittate-clasping, entire or toothed; petals longer than the calyx; pods narrow, long; pedicels erect or spreading. Wooded hillsides; May; Fayette and Muscatine counties; rare.

* * *Seeds wingless, oblong or elliptical, stem branching from base.*

A. dentata T. & G. *Toothed R.* Stem 1-2 feet high, pubescent; root leaves on short margined petioles, obovate, dentate; stem leaves oblong, obtuse, sharply and unevenly toothed, auriculate clasping; pods slender, spreading, short pedicelled. Low grounds; May-June; infrequent; Winneshiek, Fayette, Scott, Muscatine, Henry, Story, and Decatur counties.

A. lyrata L. *Lyre-leaved R.* Tufted, 4-12 inches high; glabrous or pubescent below; radical leaves lyrate-pinnatifid; stem leaves linear to spatulate, entire or toothed; petals white, longer than the calyx; pods ascending, spreading, long, slender. Rocky woods; April-July; common in N. E. Iowa; Winneshiek, Allamakee, Clayton, Dubuque, and Scott counties.

* * * *Seeds in 2 indistinct rows; cauline leaves sagittate-clasping.*

A. confinis Watson. Stem 1-3 feet high, erect, somewhat glaucous; root-stock running; root-leaves petioled, narrow spatulate; stem-leaves sessile, lanceolate or oblong-linear, entire, or lower ones occasionally toothed; petals white to rose purple, twice the length of the calyx; pods 2-4 inches long, flat, pedicels and pods erect or spreading; seeds wing-margined. Rocky woods; June-July; frequent; Winneshiek, Allamakee, Scott, Johnson, and Emmet counties. (*A. brachycarpa* (T. & G.) Britton.)

A. perfoliata Lam. *Tower Mustard*. Stem 2-4 feet high, erect, glaucous above, smooth; root-leaves petioled, lanceolate or oblong; stem-leaves sessile, entire, oblong or lanceolate; corolla yellowish white, little longer than the calyx; pods narrow, 3-6 inches long; seeds marginless. Reported from Benton and Johnson counties. (*A. glabra* (L.) Bernh.)

* * * * *Seeds nearly wingless, leaves simple, flowers greenish white.*

A. hirsuta Scop. Erect, simple, 1-2 feet high, rough-pubescent or nearly glabrous; root-leaves obovate or spatulate, dentate or repand, petioled; stem-leaves oblong to lanceolate, sessile, auricled; petals longer than the calyx; pedicels and pods erect, immature seeds in 2 rows. Rocky woods; May-June; infrequent; Clinton, Jackson, Muscatine, Johnson, Story, Woodbury, and Lyon counties.

DRAVA L. WHITLOW GRASS. Ours low annuals, with sessile hairy leaves, and racemose white flowers. Petals 2 or more times the length of the calyx. Pods oval to oblong or linear, flattened; valves nerveless. Seeds in two rows, marginless.

D. caroliniana Walt. Stem 1-5 inches high; leaves tufted, oblong or obovate, entire or rarely toothed; flowers on scape-like peduncles; raceme short or corymbose in fruit; pods linear, broad, smooth, longer than the pedicels. Sandy places; March-May; infrequent; Winneshiek, Fayette, Muscatine, Johnson, Linn, Story, and Hardin counties.

D. cuneifolia Nutt. Stem 4-8 inches high, branched below, leafy; leaves obovate to wedge-shaped or spatulate, toothed; raceme elongated in fruit, pods oblong-linear, longer than the horizontal pedicels; March-April; Reported from Scott county.

D. verna L. Stems scapose, 1-5 inches high; leaves basal, tufted, oblong or oblanceolate, entire or dentate; petals deeply 2-cleft. Reported from Scott county.

DENTARIA L. TOOTHWORT. PEPPER-ROOT. Perennials. Stem-leaves few, opposite or whorled, about 3-divided, the divisions coarsely toothed or lobed. Flowers large, showy, white, in terminal clusters, pedicelled. Pods linear, flat, valves nerveless or with a faint midnerve.

D. laciniata Muhl. Stems 6-14 inches high, scapose; tubers several, deep seated; leaves petioled, the cauline usually 3, verticillate, 3-parted, the divisions lanceolate, oblong or linear, toothed or incisely lobed; flowers white or rose color. Rich woods; April-June; not uncommon, widely distributed.

D. diphylla L. Rootstock elongated, continuous; stem leaves 2, opposite; leaflets 3, ovate, crenate; flowers white. Hancock county, near Twin Lakes, collected in 1882 by Prof. Shimek. The species is also given in Arthur's catalogue without locality.

CARDAMINE L. Herbs, with alternate leaves, and racemose or corymbose white or purple flowers. Pods linear, flattened, pedicelled; valves veinless.

C. rhomboidea DC. Spring Cress. Perennial, glabrous; stem 6-18 inches high, from a tuberous base; root-leaves oval or orbicular, entire or angled, long-petioled; stem-leaves simple oblong or oblong-ovate, sessile to short-petioled; flowers large, white; petals 3 or 4 times the length of the calyx. Wet meadows; April-June; common. (*C. bulbosa* (Schreb.) B. S. P.)

C. purpurea (Torr.) Britton. Purple C. Stem 4-10 inches high, from tuberous rootstocks; leaves similar to the preceding; flowers purple, appearing 2 weeks before the last. Common in Johnson county. (*C. rhomboidea purpurea* T. & G.)

C. hirsuta L. Small or hairy Bitter C. Somewhat pubescent; leaves mostly basal, pinnate, the terminal segments orbicular, entire, or few toothed, the lateral obovate or narrower; the stem-leaves few, low, segments linear; flowers small, white; pods linear, erect. Wet places; May-July; frequent.

ALYSSUM L. Flowers small, yellow, racemose. Pods small, orbicular; valves convex, nerveless, the margins flattened. Seeds 1-several in each cell.

A. calycinum L. Plant a small hoary annual, 3-10 inches high, with linear-spatulate leaves, and pale yellow or whitish flowers; petals slightly exceeding the persistent calyx; pods orbicular, margined, 2-celled, with 2 seeds in each cell. Reported as rare from Story county.

CAMELINA Crantz. Flowers small, yellow. Pods pear-shaped, pointed, flattish parallel to the broad partition; valves 1-nerved. Seeds oblong, numerous.

C. sativa (L.) Crantz. *False Flax*. Annual; lower leaves lanceolate, petioled, entire or toothed; upper sessile, entire, clasping by a sagittate base; pods large, margined. Waste places, along railways and in flax fields; June-July; infrequent; Winneshiek, Buchanan, Story, and Emmet counties.

RAPHANUS L. **RADISH**. Biennials with lyrate-pinnatifid leaves and showy flowers. Pods linear, terete, long pointed, constricted, indehiscent. Seeds in a single series, globose, cushioned.

R. sativus L. Stem 2-4 feet high, from a descending fusiform root, branched, covered with scattered spines; leaves petioled, roughly pubescent; flowers white to pinkish. Waste places; June-September; occasionally an escape from cultivation.

CAPPARIDACEAE *Lindl.* CAPER FAMILY.

Herbs, with alternate compound exstipulate leaves, and cruciform hypogynous flowers. Stamens 6 or more, never tetradyamous. Fruit a 2-valved, 1-celled pod with 2 parietal placentæ. Seeds many, reniform.

POLANISIA. Stamens 8 or more; pod sessile or nearly so, many seeded.

CLEOME. Stamens 6; pod long-stipitate, few-seeded.

POLANISIA Raf. Strong scented annuals, with glandular viscid hairs, and palmately compound leaves. Flowers in leafy racemes. Sepals 4, spreading, deciduous. Petals 4, with claws, notched at the apex. Stamens 8-many, unequal. Pod linear or oblong, veiny, many-seeded.

P. graveolens Raf. Stem 4-15 inches high; leaflets 3, oblong; flowers axillary, solitary, small; calyx and filaments purplish; petals yellowish white, cuneate; stamens about 11, about the length of the petals; styles short; pod 1-2 inches long, slightly stipitate. Sandy shores; May-July; infrequent; Muscatine and Emmet counties, and reported from a number of other localities.

P. trachysperma T. & G. Flowers larger; stamens 12-16, long exserted; pod sessile or nearly so. Sandy shores; May-July; common. This and the preceding species have been confused in Iowa herbaria.

CLEOME L. Ours a glabrous branching herb, with digitately 3-foliate leaves and white or rose colored flowers in leafy-bracteate racemes. Sepals and petals 4. Stamens 6. Pod linear or oblong, stipitate, many-seeded.

C integrifolia T. & G. Stem erect 2-3 feet high, branching; leaflets lanceolate or oblong, entire or serrulate; calyx 4-cleft; racemes elongated in fruit; bracts lanceolate or linear; stipe and pedicel about equal. Waste places; July-September; common in western Iowa, infrequent elsewhere; Muscatine, Linn, Woodbury, Monona, Harrison, Pottawattomie, and Fremont counties. (*C. serrulata* Pursh.)

Reseda luteola L. of the order RESEDACEAE S. F. Gray has been reported from Lee county by Arthur. The species is known as Dyer's Weed or Weld. It has simple entire sessile lanceolate or linear leaves and green-

ish yellow flowers in long slender spikes. Sepals 4. Petals 4 or 5, the upper lobed, the lower entire. The species is found in waste places near New York and other seaports and is doubtful as an Iowa plant.

CISTACEAE *Lindl.* ROCK-ROSE FAMILY.

Herbs or shrubs; stems terete. Leaves simple, alternate or opposite, entire, sessile or petioled; stipules foliaceous. Flowers perfect, solitary or in cymose or paniculate clusters. Sepals 5, unequal, persistent. Petals 3-5, convolute in the bud. Stamens indefinite; anthers 2-celled, introrse. Capsule 1-celled, 3-5-valved, sometimes with 3-5 imperfect cells and with 3-5 parietal placentæ. Seeds few to many.

HELIANTHEMUM. Petals 5, large, yellow, fugaceous or none; stamens many.

LECHEA. Petals 3, small, brown-purple; stamens 3-12.

HELIANTHEMUM Pers. Sepals 5, the 2 outer smaller, bract-like. Petals 5. Styles short or none; stigma 3-lobed. Capsules triangular, 1-celled, opening at the top. Flowers frequently of two kinds, the early ones larger, yellow, with many stamens and many-seeded pods; petals lasting only one day; later flowers smaller, often apetalous, stamens 3-10, pods small, few-seeded.

H. majus (L.) B. S. P. Whole plant hoary-canescens; stem 1-2 feet high, erect, simple, at length much branched, the branches ascending; leaves oblong-lanceolate, short-petioled, stellate-canescens beneath, petaliferous flowers in a terminal cymose panicle, 6-11, their capsules about twice the size of those of the apetalous flowers which appear later in axillary clusters. Dry soil, prairies; June-July; frequent. Iowa specimens have usually been referred to *H. canadense* Mx. of Gray's Manual.

LECHEA Kalm. PINWEED. Perennial herbs, somewhat woody below, with purplish or greenish flowers. Sepals 5, 2 outer bract-like. Petals 3, lanceolate, not longer than the calyx. Stamens 3-12. Style nearly obsolete; stigmas 3, scarcely distinct. Pod globular, 3-valved, imperfectly 3-celled; placentæ 3, each 2-seeded.

L. stricta Legget. Stems about 1 foot high, reddish below, fastigiately branched, strigose-canescens; leaves linear, acute; flowers numerous, racemiform, small, on pedicels twice the length of the flower. Dry upland soil; July-August; reported as belonging to the flora of Iowa.

L. tenuifolia Mx. Stems tufted, 4-10 inches high, much branched, minutely strigose-pubescent; leaves narrowly linear to filiform, sessile or nearly so; flowers more or less secund. Dry soil; July-August; Van Buren, Henry, and Johnson counties. *L. minor* L. has been frequently reported but the specimens probably belong here.

VIOLACEAE DC. VIOLET FAMILY.

Low perennial herbs, with alternate or basal leaves, usually scarious stipules and axillary nodding flowers. Sepals 5, persistent, auriculate at the base. Petals 5, unequal, inferior one spurred. Stamens 5, hypogynous, 2 with appendages extending into the hollow spur of the inferior petal; anthers connate, filaments broad, extending beyond the anthers and uniting over the stigma. Pistil 1, club-shaped; stigma turned to one side. Pod 1-celled, 3-valved, with 3 parietal placentæ. Represented in Iowa by the genus *VIOLA* L, the violets.

* Stemless plants with a short and thick rootstock.

† Lateral petals bearded.

V. cucullata Ait. Common Blue V. Glabrous or slightly pubescent; leaves

cordate-reniform or ovate, crenate; flowers blue, purple, white or intermediate. Moist low woodlands; April-June; common. (*V. obliqua* Hill. *V. communis* Pollard.)

V. palmata L. *Hand-leaved V.* Pubescent to glabrous; leaves cordate, palmately to hastately-lobed, middle lobe the longest; lobes ovate to linear; flowers blue, pale, or whitish. Moist or dry sterile soil; April-May; frequent; Scott, Muscatine, Henry, Appanoose, Decatur, Fremont, and Story counties.

V. pedatifida Don. *Prairie V.* Leaves 5-7-parted, divisions 2-3-cleft; lobes linear, obtuse; flowers blue. Prairies; April-May; common.

V. sagittata Ait. *Arrow-leaved V.* Smooth or somewhat pubescent: leaves on short margined petioles, or on long naked ones, ovate to oblong-ovate or lanceolate, denticulate, frequently cut-toothed near the sagittate base. Dry or moist grassy places; April-May; Muscatine and Johnson counties, reported from Fayette, Scott, and Henry counties. Forms of this and of the first two are with difficulty distinguished.

†† *Lateral petals not bearded.*

V. pedata L. *Bird's-foot V.* Leaves 3-5-divided, divisions 2-3-lobed, frequently toothed at the apex; flowers large, an inch across, deep purple to blue, the two upper petals sometimes dark purple. Prairies and open upland woods; April-June; frequent; Winneshiek, Fayette, Scott, Muscatine, Henry, Johnson, Decatur, Polk, Story, and Calhoun counties.

* * *Stemless plants, with long, filiform creeping rootstocks and white flowers.*

V. blanda Willd. *Sweet White V.* Leaves cordate or reniform, usually glabrous; flowers faintly sweet scented; petals usually beardless. Meadows; May; rare; Reported from Fayette, Scott, and Muscatine counties.

V. lanceolata L. *Lance-leaved V.* Plant glabrous; stolons extensive, rooting at the nodes and bearing apetalous flowers; leaves lanceolate, erect, obtuse, tapering into a long margined petiole, obscurely crenate; petals beardless. Damp soil, local; June; Cedar river region, Muscatine county.

V. primulaefolia L. *Primrose-leaved V.* Glabrous to pubescent; leaves oval or ovate, blade decurrent on the petiole or frequently cordate at the base; sepals lanceolate, acuminate; petals often acute; lateral usually slightly bearded. Damp soil, local; June; Cedar river region, Muscatine county.

* * * *Rootstocks short and thick; leafy-stemmed plants.*

V. pubescens Ait. *Downy Yellow V.* Soft pubescent; leaves broadly ovate or reniform, base cordate, obtusely toothed and pointed; stipules large ovate or ovate-lanceolate, entire or somewhat toothed; flowers yellow, lower petals purple-veined, spur short; stigma beakless, pubescent. Rich woods; May; common throughout.

V. canadensis L. *Canada V.* Stem 4-16 inches high; leaves broadly ovate, cordate, serrate, acute or pointed; flowers whitish, upper petals purple-tinged, the lateral bearded. First found at Decorah, Winneshiek county, with small pink flowers and beardless petals (Arthur). Also reported from Woodbury county by Prof. Pammel. Found by the writer in Winneshiek and Allamakee counties, in damp woods; June-July; infrequent.

* * * * *Rootstocks annual, biennial, or perennial; leafy throughout; stipules large, foliaceous, lyrate-pinnatifid.*

V. tricolor L. *Pansy, Heart's-ease.* Stem angled and branched, leafy; leaves oval or heart-shaped, crenate or entire; petals blue, purple, yellow or white. The so-called var. *arvensis* DC. has the petals shorter or but little

exceeding the calyx and is the wild representative of the common garden pansy. Occasionally escaped; reported by Arthur as belonging to the Iowa flora, also by Gray's Manual.

CARYOPHYLLACEAE Richenb PINK FAMILY.

Annual, biennial, or perennial herbs, often with swollen joints, opposite or verticillate entire leaves, and regular sometimes apetalous flowers. Calyx persistent; sepals 4 or 5, separate or united into a calyx tube. Petals 4 or 5. Stamens double the number of the sepals or fewer. Styles 2-5, stigmatic along the inside. Ovary usually 1-celled. Fruit a membranous capsule, dehiscing by teeth or valves or else an indehiscent achene or utricle. Stipules wanting in our species.

* *Calyx of united sepals, tubular or ovoid.*

DIANTHUS. Calyx terete, with scaly bractlets; styles 2.

SAPONARIA. Calyx oblong cylindrical, obscurely nerved or 5-angled; styles 2.

SILENE. Calyx 5-toothed or 5-cleft, 10-nerved; styles 3.

LYCHNIS. Calyx 5-toothed, 10-nerved; styles 5, opposite the calyx lobes.

AGROSTEMMA. Calyx 5-toothed, 10-nerved; styles 5, alternate with the calyx lobes.

** *Calyx of distinct sepals, or united only at the base.*

ARENARIA. Petals entire; styles usually 3.

STELLARIA. Petals 2-cleft or wanting; styles usually 3.

CERASTIUM. Petals notched or 2-cleft; styles 4 or 5.

DIANTHUS L. *Pink.* This genus is represented in our flora by an annual, with linear leaves, and small pink flowers borne in terminal clusters. Calyx terete, bracted at the base, tubular, 5-toothed, many-striate. Petals 5, long-clawed, dentate or crenate. Stamens 10. Styles 2. Ovary 1-celled, stipitate. Capsule oblong, opening at the summit by means of 4 or 5 valves or teeth.

D. armeria L. *Deptford P.* Stem $\frac{1}{2}$ - $1\frac{1}{2}$ feet high; lanceolate; leaves acute or lower obtuse; bractlets lanceolate-subulate; flowers white-dotted. Upland woods; June-July; infrequent; Johnson county; introduced.

SAPONARIA L. Annual or perennial glabrous herbs, with broad leaves, and conspicuous flowers. Calyx ovoid or oblong, 5-toothed, faintly nerved, naked. Stamens 10. Styles 2. Capsule 1-celled, or partially 2-4-celled, 4-toothed at the summit.

S. officinalis L. *Soapwort. Bouncing Bet.* Perennial; stem 1-2 feet high, sparingly branched; leaves oval-lanceolate, 3-5-ribbed, short petioled; flowers whitish or pink, in terminal corymbs; petals obcordate, clawed, appendaged. Waysides, waste places, old garden sites; July-August; frequent.

S. vaccaria L. *Cow-herb.* Annual, stem 1-3 feet high, branched above; leaves lanceolate or ovate-lanceolate, acute, connate; flowers pale red, in loose corymbed cymes; calyx 5-ribbed, in fruit inflated and wing-angled; petals crenulate, not appendaged. Fields and waste places; June-August; infrequent; Winneshiek, Scott, Henry, Johnson, Story, and Lyon counties.

SILENE L. Annual or perennial herbs with opposite or verticillate leaves and solitary or cymose flowers. Calyx 5-toothed or 5-cleft, 10-many-nerved, bractless. Petals 5, clawed. Stamens 10. Styles usually 3. Pod 1-celled, sometimes 3-celled below, opening above by 3 or 6 teeth.

* *Perennials; calyx inflated.*

S. stellata (L.) Ait. *Starry campion.* Stem 2-4 feet high; leaves mostly in 4's, a few opposite, ovate-lanceolate, acuminate, margins ciliate; flowers in panicled cymes; calyx campanulate, inflated, teeth triangular; petals white, fringed. Woods; June-August; common.

S. nivea Otth. Stem 1-3 feet high, rather weak, erect or ascending, sim-

ple or some branched; leaves opposite, lanceolate or oblong-lanceolate, acuminate; petals white, cuneate, 2-cleft or 2-lobed. Low prairies and woods; June-July; infrequent; Winneshiek, Allamakee, Fayette, and Johnson counties. (*S. alba* Muhl.)

S. cucubalus Wibel. *Bladder campion*. Glaucous; stem $1\frac{1}{2}$ - $1\frac{1}{2}$ feet high, branched from the base, usually glabrous; flowers numerous, in leafless cymes; calyx globular, much inflated. Reported from Ames, Story county. (*S. vulgaris* (Moench) Garcke.)

* * *Annuals; calyx not inflated.*

S. antirrhina L. *Sleepy Catchfly*. Stem 1-3 feet high, pubescent or glabrous, simple or branched, slender, a portion of the internodes glutinous; leaves linear or narrowly lanceolate, sessile, the upper passing into bracts, the lower spatulate, tapering into a petiole; flowers small, paniculate, pink, transient in the sunshine; calyx ovoid, petals obcordate. Dry soil; June-September; common.

S. noctiflora L. Stem 1-3 feet high, viscid-hairy; lower leaves large, spatulate or oblanceolate, narrowed into a broad petiole, upper leaves lanceolate, acute; flowers fragrant, opening in the evening, closing next morning; calyx tubular, becoming ovoid, teeth linear; petals 2-parted. Waste places; July-September; infrequent; Fayette, Scott, Story, Emmet, Lyon, Calhoun, and Fremont counties.

LYCHNIS L. Ours a biennial herb. Petals 5, narrowly clawed, 2-cleft. Stamens 10. Styles 5, opposite the calyx lobes. Ovary 1-celled, many-ovuled. Capsule dehiscing by 10 or fewer apical teeth.

L. vespertina Sibth. Plant viscid pubescent, often dioecious, much the aspect of *Silene noctiflora* L.; stem 1-2 feet high, branched; leaves ovate-oblong or lanceolate, acute, lower with margined petioles; flowers paniculate, white or pinkish, opening at dusk and closing next morning; calyx tubular, ovoid in fruit, petals crowned. Waste places; June-August; rare; reported from Winneshiek, Story, and Montgomery counties. (*L. alba* Mill.)

AGROSTEMMA L. Annual pubescent herb, with linear-lanceolate sessile leaves, and large red flowers. Calyx oblong, 5-lobed, 10-ribbed, not inflated. Petals 5, shorter than the calyx lobes, not appendaged. Styles 5, alternate with calyx lobes. Capsule 1-celled.

A. githago L. *Corn Cockle*. Stem 1-3 feet high, mostly simple; flowers solitary, on long axillary peduncles; petals obovate-cuneate, slightly emarginate. Waste places; July-September; infrequent, but widely distributed. (*Lychnis githago* Lam. of Gray's Manual.)

ARENARIA L. Ours perennials, with sessile leaves, and small white flowers. Sepals and petals 4 or 5. Stamens 10. Styles 2. Pod 1-celled, dehiscing at the apex by 3 or 6 valves.

A. michauxii Hook. f. Stems 6-14 inches high, tufted, erect or nearly so; leaves filiform or subulate, 1-ribbed; flowers cymose, bracted, parts in 5's sepals ovate, pointed, 3-ribbed, slightly shorter than the ovoid pod, and half the length of the petals. Dry prairies; May-July; infrequent; Fayette county, reported from Clinton county. (*A. stricta* Mx.)

A. lateriflora L. Stems 4-12 inches high, erect or ascending, mostly simple, finely pubescent; leaves thin, oval or oblong, obtuse, margin and nerves ciliate; flowers solitary or in few-flowered lateral or terminal cymes, white, parts in 4's or 5's; sepals oblong, obtuse or acute, half the length of the petioles; ovary at first 3-celled; capsule ovoid, about twice the length of the

calyx, dehiscent by 3 2-cleft valves. Sandy shores; May-July; frequent; Winneshiek, Fayette, Scott, Muscatine, Henry, Johnson, and Chickasaw counties. (*Moehringia lateriflora* (L.) Fenzl.)

STELLARIA L. Tufted annual herbs, with solitary or cymose white flowers. Sepals 4-5. Petals 4-5, deeply 2-cleft. Stamens 10, 8, or less. Pod ovoid, 1-celled, dehiscing by about 6 valves.

S. media Smith. *Common Chickweed*. Stem angled, erect or ascending, much branched, glabrous except 1 or 2 pubescent lines; leaves ovate or oval, acute, with ciliate petioles, the upper sessile; flowers solitary, axillary, or in terminal leafy cymes; petals shorter than the calyx; stamens 2-10. Waste places, fields and woods; June-August; infrequent; Muscatine county; reported from Winneshiek, Fayette, Woodbury, and Lyon counties. (*A. longifolia* (Muhl.) Britton.)

S. longifolia Muhl. *Long-leaved Stitchwort*. Stems erect, weak, glabrous, or with rough angles; leaves linear, spreading, acutish at both ends; pedicels slender, divaricate; sepals lanceolate, acute, 3-nerved, equalling or shorter than the petioles; capsule ovoid-oblong, about twice the length of the calyx. Grassy places, meadows and woods; May-July; frequent; Winneshiek, Fayette, Muscatine, Johnson, Linn, Story, Emmet, Woodbury, and Lyon counties. (*A. longifolia* (Muhl.) Britton.)

CERASTIUM L. Annuals or perennials, mostly pubescent or hirsute, with mostly flat leaves, and white flowers in terminal cymes. Sepals and petals in our species 5. Petals notched or 2 cleft. Stamens usually 10. Styles 5, opposite the sepals. Pod membranous, dehiscing at the apex by 10 teeth, elongated, many-seeded.

C. nutans Raf. Annual; stem 6-20 inches high, weak, reclining or ascending, clammy-pubescent, rarely glabrate; leaves oblong-lanceolate, acute, lower spatulate; cymes loose, many-flowered; pods nodding, much exceeding the calyx, curved upward. Grassy moist places; May-June; frequent; Winneshiek, Scott, Muscatine, Henry, Johnson, and Decatur counties.

C. vulgatum L. Biennial or perennial; stems viscid-pubescent, tufted, erect or ascending, 6-18 inches high; leaves oblong, the lower spatulate-oblong, obtuse; bracts scarious-margined; petals about equalling the calyx; pod elongated, curved upward. Grassy banks; May-September; frequent; Allamakee, Fayette, Scott, Muscatine, Henry, Johnson, Linn, and Decatur counties.

C. arvense L. Perennial; stems tufted; lower leaves linear-oblong, the upper distant, linear or linear-lanceolate; flowers larger, petals obovate, twice the length of the calyx; pod equal or but little exceeding the calyx. Winneshiek county. The variety *oblongifolium* (Torr.) Holl. & Britt. larger, leaves oblong or lanceolate, pod twice the length of the calyx, is reported from Fayette county. Various other localities are claimed for both species and variety.

PURTULACACEAE Reichenb. PURSLANE FAMILY.

Herbs, with fleshy entire exstipulate leaves, and regular mostly ephemeral flowers which open only in the sunshine. Sepals 2. Petals 5. Stamens 5, opposite to the petals, or often many. Styles 2-8, united below, stigmatic along the inner surface. Ovary free, 1-celled. Pod 1-celled, few to many-seeded.

TALINUM. Stamens usually many; pod 3-valved, with many seeds on a globular stalked placentæ.

CLAYTONIA. Stamens 5; pod 3-valved.

PORTULACA. Stamens 7-20; pod globular, opening by a lid.

TALINUM Adans. Ours perennial, with alternate linear leaves, and cymose flowers. Sepals ovate. Petals fugaceous. Styles 3-lobed.

T. teretifolium Pursh. Plant 4-12 inches high, leafy below, scapose above; leaves cylindrical; peduncles slender, bracted, branched; flowers pink; sepals membranous, half the length of the petals; stamens 10-30; style as long as the stamens. Sioux quartzite exposures; June-August; common; Lyon and Woodbury counties.

CLAYTONIA L. Low perennial spring plants, with simple stems from tuberous roots, and entire leaves. Sepals ovate, persistent. Petals 5, hypogynous. Stamens 5, adhering to the short claws of the petals. Style 3-cleft. Pod 3-valved, 2-5-seeded.

C. virginica L. *Spring Beauty.* Tuber globular, deep seated; stems 6-9 inches high, weak, with 2 opposite linear or linear-lanceolate leaves; flowers white or roseate, in a terminal loose raceme. Rich woods; April-May; common.

C. caroliniana Mx. Similar to the preceeding; basal leaves ovate-lanceolate or oblong, caudine leaves petioled. Reported as an Iowa species by Arthur.

PORTULACA L. *PURSLANE.* Annuals, with succulent stems and leaves, and small yellow mostly ephemeral flowers. Calyx 2-cleft, upper portion deciduous, the tube cohering with the ovary. Petals 5, rarely more or less, equal, fugaceous. Stamens 8-20, inserted on the calyx along with the petals. Style 3-8-parted. Pod globular, 1-celled, many-seeded, opening transversely near the middle by a lid.

P. oleracea L. *Common P.* Stems prostrate, smooth, reddish; leaves obovate or cuneate, apex rounded; flowers sessile, solitary, pale yellow; sepals keeled; stamens 7-12; style about 6-parted. Cultivated grounds and waste places; June-September; common.

P. retusa Engelm. Similar to the preceeding but the leaves cuneate, the apex retuse or emarginate. Reported from Scott county.

HYPERICACEAE *Lindl.* ST. JOHN'S-WORT FAMILY.

Herbs or small shrubs, with opposite entire punctate or dotted exstipulate leaves, and regular and perfect solitary or cymose flowers. Sepals 4-5, imbricated. Petals 4-5, mostly oblique or contorted, convoluted or imbricated in the bud. Stamens few or many, usually in 3 or more clusters. Ovary 1-7-celled; styles 1-7. Pod 1-7-celled, with septicidal dehiscence.

HYPERICUM. Petals yellow, convolute.

ELODES. Petals purplish, imbricate.

HYPERICUM L. The principal genus of the order.

* *Perennials; styles 5.*

H. ascyron L. *Great St. John's-wort.* Stems 2-6 feet high; leaves ovate-oblong or ovate-lanceolate, sessile, clasping, acute or obtuse; flowers large, in terminal cymes; styles numerous, in 5 sets; styles united below; pod conical or ovoid. Rich woods, banks; July; infrequent; Winneshiek, Allamakee, Clayton, Fayette, Scott, Muscatine, Henry, Johnson, Story, Winnebago, and Cerro Gordo counties.

* * *Perennials; stamens numerous; styles 3.*

H. prolificum L. *Shrubby St. J.* A small shrub, 1-6 feet high; leaves nar-

rowly oblong or oblanceolate, base tapering into a short petiole; stamens distinct; pod 3-celled. Dry soil, fence rows and thickets; July-August; infrequent; Johnson, Jefferson, Henry, Des Moines, Lee, and Appanoose counties.

H. cistifolium Lam. Stem 1-2 feet high, 4-angled, from a somewhat woody perennial base; leaves linear-oblong, obtuse, sessile, somewhat clasping, with smaller leaves in the axils; cyme compound, many-flowered; sepals ovate, varying to linear; stamens distinct; capsule 1-celled, with 3 parietal placentæ. Sterile soil; July-August; frequent; Dubuque, Muscatine, Johnson, Henry, Appanoose, and Fremont counties, reported from Clinton and Benton counties. (*H. sphaerocarpum* Mx.)

H. maculatum Walt. Stem 1-3 feet high, from a woody perennial base; leaves short-petioled, sessile or clasping, oblong or ovate-lanceolate, obtuse, black-dotted; flowers small, numerous; sepals ovate; petals longer, pale-yellow; stamens in 3 or 5 sets; capsules 3-celled. Moist soil, fields and open woods; July-September; frequent.

H. perforatum L. Leaves oblong or linear; sepals lanceolate. Introduced, Henry county, and probably other localities.

* * * *Annuals; stamens few; styles 3.*

H. muticum L. Stems tufted, $\frac{1}{2}$ - $\frac{3}{4}$ feet high, branched; leaves ovate or oblong, obtuse, sessile or partly clasping, 5-nerved; flowers small, subulate-bracted; sepals linear to oblanceolate; pods ovate-conical, exceeding the calyx. Low places, open woods; July-September; common; Decatur and Johnson counties, reported from Muscatine and Scott counties.

H. majus (Gray.) Britton. Stems varying from $\frac{1}{2}$ -2 feet high, with nearly erect branches; leaves lanceolate or oblong-lanceolate, sessile, 5-7-nerved, obtuse or acute; bracts subulate; sepals lanceolate, acuminate. Moist soil; June-September; frequent.

H. canadense L. Stems $\frac{1}{2}$ -2 feet high, with erect or ascending angular branches; leaves linear, 3-nerved, obtuse, tapering toward the base; bracts and sepals similar to those of the last. Sandy soil; July-September; probably frequent.

H. drummondii (G. & H.) T. & G. A bushy branched annual, 1- $\frac{2}{3}$ feet high, with small linear-subulate 1-nerved leaves, and scattered flowers; sepals lance-linear, exceeding the petals; stamens 10-20; styles 3. Dry soil; July-September; reported from Iowa.

ELODES Adans. Perennial herbs of marshy places with opposite leaves and pink or greenish purple flowers in terminal or axillary cymes. Sepals 5, equal. Petals 5, imbricated in the bud, not contorted. Stamens 9 or more, in 3 sets which are separated by large orange-colored glands. Styles 3. Pods oblong, 3-celled.

E. campanulata Pursh. Stem 1-2 feet high, nearly simple; leaves ovate or oblong, sessile or cordate-clasping, glaucous beneath, apex very obtuse or emarginate; capsule and frequently the stem red purple. Borders of swamps; July-September; infrequent; Fayette, Muscatine, Cerro Gordo, and Emmet counties. (*Triadenium virginicum* (L.) Raf.)

MALVACEAE Neck. MALLOW FAMILY.

Herbs or shrubs, with fibrous bark, simple alternate stipulate usually palmately-veined leaves, and axillary flowers on jointed pedicels. Calyx 5-lobed, valvate, often with an involucre of few or many bractlets at the

base. Petals alternate with the calyx lobes, hypogynous, convolute in the bud. Stamens many, united at the base with the short claws of the petals, filaments more or less monodelphous; anthers 1-celled, reniform. Pistils several; stigmas various. Ovaries circularly arranged or forming a several-celled pod.

* *Carpels 5-20; united in a ring around a central axis.*

† *Styles stigmatic down the inside; carpels 1-seeded.*

MALVA. Involucel of 3 bractlets; carpels beakless; petals obcordate.

CALLIRRHOE. Involucel of 3 bractlets; carpels beaked; petals truncate.

NAPAEA. Involucel none; flowers dioecious; carpels beakless.

† † *Styles with terminal capitulate stigmas; carpels 1-few-seeded.*

ABUTILON. Involucel none; carpels 12-13, 3-seeded.

SIDA. Involucel none; carpels 1-seeded.

MALVASTRUM. Involucel of 3 bractlets; seeds solitary, ascending, filling the cell.

* * *Fruit a 5-celled bicuttidental pod.*

HIBISCUS. Involucel of many bractlets; pod 5-celled, many-seeded.

MALVA L. **MALLOW.** Calyx 5-cleft. Involucel 3-leaved. Petals obcordate. Styles many, stigmatic down the inner side. Carpels as many as the styles, blunt, depressed, 1-seeded.

M. rotundifolia L. **Common M.** Root large, biennial; stems procumbent; leaves on long petioles, round-reniform, cordate, obscurely 5-lobed, crenate; flowers axillary; petals white, twice the length of the calyx; fruit depressed, pubescent. Waysides and waste places; June-September; common.

M. sylvestris L. **High M.** Stem 2-3 feet high, erect, branched; leaves orbicular or reniform, sharply 5-7-lobed, crenate; flowers in axillary clusters; petals 3 times the length of the calyx, reddish-purple; carpels wrinkled-veiny. Waste places near gardens; June-July; rather infrequent; Fayette, Scott, Muscatine, Johnson, Story, Shelby, and Emmet counties.

M. crispa L. **Curled M.** An erect annual, glabrous or nearly so; leaves nearly orbicular, with 5-11 shallow angular lobes, the margin dentate, crisped and wrinkled; flowers small, sessile, in axillary clusters. Waste places; infrequent; Winneshiek and Decatur counties. (*M. verticillata crispa* L.)

CALLIRRHOE Nutt. Herbs with lobed or divided leaves and axillary or terminal flowers. Calyx deeply 5-parted, naked or with a 3-leaved involucel. Petals cuneate, truncate, rose-purple. Styles 10-20, stigmatic down the inner side. Carpels as many as the styles, short-beaked, 1-seeded.

C. involucrata Gray. Stems 1-2 feet long, from a large descending tuberous root, procumbent or ascending, hirsute; leaves rounded, 5-7 palmately-cleft or parted, segments incisely cut or lobed; flowers large, axillary, on long peduncles; sepals long-lanceolate, 3-5-nerved, longer than the involucel; carpels indehiscent, reticulated. Dry soil; May-August; locally frequent; Scott and Shelby counties. In most cases apparently an escape from cultivation.

C. triangulata Gray. Stems from a tuberous root, erect, pubescent; leaves triangular or halberd-shaped, crenate, sometimes heart-shaped and lobed; involucel about as long as the short calyx; sepals ovate-lanceolate, 5-nerved; flowers panicled, short-pedicelled, purple. Dry prairie soil; June-August; reported from Iowa. The author has found the species near the border.

NAPAEA L. An erect perennial with 5-9-palmately-parted leaves and small white flowers in leafy corymbose panicles. Calyx 5-cleft; involucel wanting. Petals 5, alternate, entire. Flowers dioecious. Stamine flowers

with 15-20 anthers. Pistillate flowers with 6-10 styles. Carpels 6-10, 1-seeded, beakless, minutely tipped, indehiscent, imperfectly 2-valved, separating at maturity from the axis.

N. dioica L. *Glade M.* Stem 4-6 feet high, but little branched, glabrous to appressed pubescent; leaf divisions lanceolate, acuminate, incisely lobed or toothed. Frequent in alluvial soil along the Upper Iowa river in Winneshiek and Allamakee counties, also found in Fayette county; July.

ABUTILON Gaertn. Ours an annual weed, with cordate leaves and axillary yellow flowers. Calyx deeply 5-cleft. Petals 5, alternate. Stamens many. Styles in ours about 12 or 13; stigmas capitate. Carpels 12 or 13.

A. avicinnae Gaertn. *Velvet-leaf. Cake-print.* Whole plant clothed with a soft pubescence; stem 2-5 feet high; leaves long-petioled, broadly ovate, taper-pointed, entire or obscurely dentate, base cordate; pedicels shorter than the petioles; calyx persistent; petals yellow; carpels 2-valved, each valve beaked, hairy, usually 3-seeded; flowers axillary. Waste places; June-September; common.

SIDA L. Calyx 5-cleft. Petals 5, entire, usually oblique. Styles 5 or more; stigmas capitate. Carpels as many as the styles, 1-seeded, tardily separating. Seeds pendulous.

S. spinosa L. Annual; stem 1-2 feet high, branched, minutely pubescent, leaves ovate to oblong-lanceolate, serrate, with a spinous tubercle at the base of the slender petiole; stipules bristle-like; peduncles axillary, shorter than the petioles, 1-flowered; flowers small, yellow; carpels 5. Waste places, spreading; July-September; Muscatine, Des Moines, Henry, Van Buren, Decatur, Page, and Fremont counties.

MALVASTRUM Gray. Flowers in ours solitary, in the axils of the upper leaves, short-peduncled, yellow. Bractlets of the involucel 2 or 3, linear. Calyx 5-cleft, the lobes ovate-triangular, pubescent.

M. angustum Gray. Annual, somewhat hairy, 6-12 inches high; leaves oblong-lanceolate or linear-oblong, remotely dentate; carpels 5, reniform, at length 2-valved. Reported from Scott county.

HIBISCUS L. Herbs, with dentate or lobed leaves and showy axillary or paniculate flowers. Calyx 5-cleft, involucellate at the base by a row of linear bractlets. Column long, with many lateral stamens. Styles 5, stigmas capitate. Fruit a 5-celled capsule, loculicidal. Seeds 3-many in each cell.

H. militaris Cav. *Halberd-leaved Rose-Mallow.* Perennial; stem smooth, 3-4 feet high, leaves hastately 3-lobed; lobes long acuminate, serrate, middle lobe much longer; flowers axillary, large, showy; calyx enlarged in fruit; corolla somewhat campanulate, purplish; capsule smooth; seeds hairy. Along rivers and marshy lakes; July-August; locally frequent; Muscatine, Louisa, Des Moines, Johnson, and Fremont counties.

H. trionum L. *Bladder Ketmia.* Annual; stems sub-erect, hispid; leaves 3-parted, middle segments long, all segments sinuate-lobed or cleft; fruiting calyx enlarged, membranaceous, 5-winged; flowers yellowish, with a dark centre, lasting only for the day. Waste places; July-September; becoming frequent.

TILIACEAE *Juss* LINDEN FAMILY.

Trees with simple alternate stipulate leaves and fibrous bark. Sepals 4-5, deciduous. Petals imbricated in the bud. Stamens many, polyadelphous, with 2-celled anthers.

TILIA L. **LINDEN. BASSWOOD.** Sepals 5, petaloid. Petals 5, oblong, obtuse. Each set of stamens with a petaloid scale at the base. Pistil 1. Ovary superior, 5-celled, each cell 2-ovuled. Fruit dry, becoming by abortion 1-celled. 1-2-seeded.

T. americana L. Tree 40-70 feet high; wood white, soft; leaves alternate, broadly ovate, pointed, sharply serrate, base cordate; stipules deciduous; flowers cream colored, fragrant, appearing after the leaves, in axillary cymes; peduncles hanging and united to a ligulate membranaceous bract; fruit ovoid. Rich woods; July; frequent, widely distributed.

LINACEAE Dumort. FLAX FAMILY.

Herbs, with alternate simple leaves, and perfect regular flowers. Stipules none or gland-like. Sepals 4-5, imbricated, persistent. Petals 4-5, hypogynous, imbricated, usually contorted. Stamens as many as the petals and alternate with them. Styles 3-5. Ovary 4-5-celled, with 2 ovules in each cell. Capsule globose.

LINUM L. **FLAX.** Herbs, with fibrous bark and sessile leaves. All parts of the flower in 5's, each series regularly alternate with the preceding. Capsule 5-celled, breaking into 5 carpels in dehiscence, each cell wholly or partly divided by a false partition. Cells with 2-suspended mucilaginous seeds.

L. usitatissimum L. *Common F.* Annual, stem terete, striate, erect, 1-2 feet high, much branched; leaves lanceolate, sessile; stipules none; flowers blue, axillary; sepals lanceolate, ciliate; petals twice the length of the sepals, crenulate; capsule globular. Spontaneous in fields and waste places, June-August; infrequent.

L. sulcatum Riddell. Annual, erect, 1-2 feet high, somewhat branched above, stem and branches narrowly wing-angled and grooved; leaves lanceolate or linear; stipules a pair of dark colored glands; flowers yellow; sepals acuminate, glandular ciliate, 1-nerved; styles united below the middle. Dry soil, prairies; June-August; common.

L. rigidum Pursh. Probably perennial, glaucous, glabrous or puberulent; branches rigid, more or less angular; upper leaves and sepals glandular-serulate. Loess hills; Woodbury and Fremont counties; frequent.

GERANIACEAE J. St. Hil.

Herbs, with alternate or opposite leaves, and perfect hypogynous regular or irregular flowers. Parts of the flower usually in 5's. Stamens as many or twice as many as the sepals, some often rudimentary. Ovary 5-celled, each cell 2-ovuled, beaked with the compound style.

GERANIUM L. Herbs, with stipulate palmately lobed leaves and axillary 1-3 flowered peduncles. Sepals and petals 5, regular, the sepals imbricated in the bud, persistent. Stamens usually 10, the 5 alternate ones longer, and provided with glands at their bases, alternate with the petals. Ovary deeply 5-lobed, 5-celled, separating into 5, 1-seeded long-tailed carpels from a persistent axis.

G. maculatum L. *Wild Crane's-bill.* Perennial, from a thick rootstock; stem 1-2 feet high, erect, hairy, branching above; leaves usually 5-parted, divisions cuneate toward the base, incisely lobed or toothed above, root-leaves on long petioles; flowers light purple, sepals ovate, pointed; petals entire, broadly oval, bearded on the claw. Rich woods; May-July; common.

G. carolinianum L. Root annual; stem 5-14 inches high, much branched, hairy; leaves about 5-parted, divisions cut into narrow lobes; flowers clus-

tered at the ends of the branches: sepals ovate, awn-pointed; petals scarcely longer than the sepals, light rose-tinted or whitish; stamens sometimes only 5. Waste places; May-August; infrequent; Fayette, Muscatine, Lee, and Johnson counties.

OXALIDACEAE *Lindl.* WOOD-SORREL FAMILY.

Annual or perennial herbs, with acidic juice, palmately trifoliate leaves, and perfect regular flowers in umbel-like or forking cymes. Represented in Iowa by the genus,

OXALIS L. WOOD-SORREL. Leaflets obovate. Sepals 5, persistent, imbricated. Petals 5, withering after flowering, sometimes united at the base, longer than the sepals. Stamens 10, monodelphous at the base, alternately shorter. Styles 5, distinct; stigmas terminal. Capsule oblong, somewhat 5-lobed, 5-celled, cells 1-several seeded.

O. stricta L. *Yellow W.* Annual or perennial, rootstock slender; stem leafy, glabrous to villous; leaves long-petioled, sensitive; stipules none; flowers yellow, peduncles long, axillary. Fields and woods; May-September; common.

O. violacea L. *Violet W.* Stemless perennials, from a brownish scaly bulb; leaflets broadly obovate; scapes 2-7 inches high, longer than the petioles, umbellately flowered; flowers nodding, violet. Fields and woods; May-June; common.

Floerkea proserpinacoides Willd. of the order **LIMNANTHACEAE** *Lindl.* has been reported from Lee county by Arthur. Annual, with 3-5 oblong or linear-oblong sometimes 2-3-cleft leaflets; and solitary axillary peduncled white flowers. Sepals and petals 3. Stamens 6. Ovaries and stigmas 3. Fruit 1-3 roughish fleshy achenes. River banks; April-June.

BALSAMINACEAE *Lindl.* JEWEL-WEED FAMILY.

Succulent herbs, with smooth weak hollow stems, simple petioled alternate exstipulate leaves, and showy irregular axillary nodding flowers. Sepals 3, the lateral 2 small, green, nerved; the posterior one large, petaloid, saccate, spurred. Petals 3, 2 of them 2-cleft. Stamens 5; filaments appendaged by scales on their inner side which connive over the stigma.

IMPATIENS L. **TOUCH-ME-NOT.** Leaves ovate, coarsely toothed. Ovary 5-celled, oblong; stigmas sessile, 5-lobed. Pod 5-valved, 5-celled, sometimes partitions not apparent, valves coiling elastically in dehiscence projecting the seed. Seeds several in each cell. Ours annuals, 2-4 feet high.

I. pallida Nutt. *Pale T.* Leaves ovate-oblong; pedicels 2-4 flowered; flowers pale yellow, sparingly dotted; sepals dilated transversely, broader than long, tipped with a short recurved spur. Moist alluvial soil; July-September; common. (*I. aurea* Muhl.)

I. fulva Nutt. *Spotted T.* Leaves rhombic-ovate; pedicels 2-4-flowered; flowers orange-yellow, thickly spotted with reddish-brown; sepals dilated lengthwise, longer than broad; spur elongated, closely reflexed. With the preceding but less frequent. (*I. biflora* Walt.)

RUTACEAE *Juss.* RUE FAMILY.

Shrubby plants, with alternate or opposite exstipulate compound leaves dotted with transparent glands which contain a volatile aromatic

or acrid oil. Parts of the flower in 3's-5's. Stamens in ours as many as the petals and alternate with them. Pistils 2-5, separate or united; styles conniving. Fruit a capsule or a samara.

XANTHOXYLUM. Flowers dioecious; fruit capsular.

PTELEA. Flowers polygamous; fruit a samara.

XANTHOXYLUM L. Small trees with prickly branches and umbel-like clusters of flowers and odd-pinnate leaves. Calyx in ours wanting. Petals 4-5; imbricated in the bud. Pistils 3-5; styles distinct below but slightly united above. Capsule coriaceous, 2-valved, with 1-2 black seeds.

X. americanum Mill. *Prickly Ash. Toothache-tree.* A small shrub, 4-10 feet high, bark and leaves pungent and aromatic; leaflets 5-9, ovate-oblong, pubescent when young; flowers appearing before the leaves, yellowish green, in sessile axillary umbels; capsules globose, short-stipitate. Upland thickets; April-May; common generally.

PTELEA L. Ours a small shrub, with 3-foliate, long-petioled leaves, the leaflets sessile, crenulate, and corymbose-paniculate greenish white flowers. Sepals and petals 3-5. Ovary flattened, 2-celled; stigmas 2. Samara orbicular, the wing membranous, reticulated, emarginate.

P. trifoliata L. *Hop-tree.* Woods; June; infrequent; Scott, Muscatine, Lee, Henry, and Johnson counties.

CELASTRACEAE *Lindl. STAFF-TREE FAMILY.*

Small trees or shrubs, often climbing, with alternate or opposite simple entire or toothed leaves, small caducous stipules, and small regular flowers. Sepals and petals imbricated in the bud. Petals 4-5, alternate with the sepals. Stamens 4-5, alternate with the petals, inserted on a disk which fills the bottom of the calyx. Styles united, Ovary sessile, 2-5-celled, free from the calyx.

EUONYMUS. Leaves opposite; a small tree.

CELASTRUS. Leaves alternate; a shrubby climber.

EUONYMUS L. Represented in our flora by the following species.

E. atropurpureus Jacq. *Burning Bush.* Shrub 5-15 feet high; leaves petioled, ovate-oblong, serrate, acuminate; flowers perfect, purple, solitary or in axillary cymes, parts usually in 4's; styles short or none; pod deeply 3-lobed, 3-4-valved, 3-4-celled, each cell 1-4-seeded; seeds covered with a scarlet aril. Rich woods; June; frequent throughout the state.

CELASTRUS L. Flowers small, dioecious or polygamous, small, greenish, in terminal raceme-like clusters. Sepals, petals and stamens 5. Disk 5-lobed, bearing the crenulate petals and stamens on the edge.

C. scandens L. *Climbing Bitter-sweet.* Shrubby, climbing; leaves petioled, ovate, thin, acuminate, serrate; pod globose, orange colored, 3-celled, 3-valved, opening in the fall and displaying the scarlet covering of the seeds; seeds 1-2 in each cell. Thickets; June; frequent.

SIMARUBACEAE *DC. AILANTHUS FAMILY.*

Distinguished from the preceding order by the non-punctate leaves. Represented in our flora by the genus *AILANTHUS* Desf.

A. glandulosa Desf. *Tree-of-Heaven.* Tree, 20-60 feet high, with long odd-pinnate petioled leaves and greenish white polygamous panicled flowers; the staminate flowers ill-scented; samaras oblong, membranous, 1-seeded, twisted. Established in and about Keokuk, Lee county.

ILICINEAE *Louie.* HOLLY FAMILY.

Shrubs, with alternate petioled simple leaves, and small solitary or clustered axillary polygamo-dioecious flowers. The principal genus in the United States is *ILEX* L.

I. verticillata (L.) A. Gray. Shrub 6-20 feet high; leaves oval, obovate to oblong-lanceolate, pointed, serrate, turning black in autumn; flowers all short peduncled, in clusters or the fertile solitary. Reported from Mitchell county by Arthur.

RHAMNACEAE *Dumort.* BUCKTHORN FAMILY.

Small trees or shrubs, with simple alternate leaves, and regular sometimes apetalous flowers. Sepals 4-5. Petals 4-5, valvate in the bud. Stamens 4-5, opposite to the petals and alternate with the sepals, inserted along with the petals into the edge of the fleshy disk which lines the calyx and sometimes the ovary. Stigmas 2-5. Ovary 2-5-celled, sessile; ovules solitary.

RHAMNUS. Calyx and disk free from the ovary; petals none or small and short clawed.

CEANOTHUS. Calyx and disk adherent to the base of the ovary; petals long clawed.

RHAMNUS L. Leaves pinnately veined. Flowers in axillary clusters, greenish. Calyx campanulate, 4-5-cleft, tube lined with the disk. Ovary free, 2-4-celled; styles 2-4. Fruit a small berry-like drupe.

R. lanceolata Pursh. *Buckthorn.* A thornless shrub, 3-10 feet high; leaves ovate-lanceolate, acute or obtuse, serrulate, petioled; flowers appearing closely after the leaves, of two sorts on different individuals, one form in short axillary clusters with a short included style, the other with often solitary longer pedicels and exserted style; petals 4, minute, deeply notched, sometimes not apparent; styles 2; fruit dark colored, 2-seeded. Upland thickets; May; a frequent shrub, widely distributed over the southern half of the state and extending far into the northern portion.

R. clinifolia L'Her. A low shrub with oval acute serrate leaves; flowers solitary or 2-3 together in the axils of the leaves, mostly dioecious, apetalous; calyx-lobes 5; stamens 5. Reported from Winnesheik county. (Arthur.)

CEANOTHUS L. Low shrubby plants, with white flowers in umbel-like clusters. Calyx 5-cleft, persistent, petaloid. Petals 5, longer than the calyx, hooded. Stamens mostly exserted. Style 3-cleft. Capsule 3-celled, 3-seeded.

C. americanus L. *New Jersey Tea.* Stems 1-3 feet high, from a dark red root, branches slightly pubescent; leaves ovate, 3-ribbed, acuminate, serrate, somewhat pubescent; peduncles axillary and terminal, elongated. Upland woods and prairies; June; common.

C. ovatus Desf. Usually smaller than the preceding; leaves oval-lanceolate or oblong, glandular serrate, peduncle short, pubescent. Prairies; May; common; Story, Shelby, Decatur, Adams, Montgomery, and Pottawattomie counties. Iowa specimens are more or less pubescent, the typical plant being glabrous throughout, hence our specimens are usually referred to the var. *pubescens* T. & G.

VITACEAE *Lindl.* GRAPE FAMILY.

Climbing shrubs, with copious watery juice, nodose joints, climbing by tendrils, alternate petioled leaves, and small regular greenish perfect or polygamo-dioecious flowers. Calyx entire or 4-5-toothed. Petals 4-5, caducous. Stamens 4-5, opposite the petals. Ovary 2-celled. Fruit a 2-celled 2-4-seeded berry.

VITIS. Leaves simple; petals united into a cap, falling away without separating; fruit pulpy, edible.

CISSUS. Leaves simple in our species; petals separate, spreading; fruit scarcely pulpy, inedible.

AMPELOPSIS. Leaves digitate; corolla expanding.

VITIS L. Shrubs, climbing by aid of coiling tendrils, with dentate or palmately lobed leaves, small caducous stipules, and fragrant thyrsoid flowers.

V. riparia Mx. Leaves shining, glabrous, sometimes pubescent on the veins beneath, sharply 5-7-lobed, sinuses acute, lobes coarsely toothed, acute. Low woods; May-June; fruit ripening July-September; common. (*V. vulpina* L.)

V. aestivalis Mx. Branches terete; leaves large, more or less deeply 3-5-lobed, dentate, whitish or rusty pubescent especially when young; berries black, with bloom. Reported from Clinton county by Arthur.

V. cinerea Engelm. Branches angled; leaves dentate, somewhat 3-lobed; pubescence whitish or grayish, persistent; berries black, without bloom. Low woods; May-June, fruit ripe in September; Muscatine, Louisa, Page, and Fremont counties.

CISSUS L. Represented in our flora by the single species,

C. ampelopsis Pers. Climbing, nearly glabrous; leaves ovate, coarsely toothed, sometimes slightly 3-lobed, acuminate, base cordate or truncate; berries 1-2-seeded. Low woods; May-June; Fremont county. (*Ampelopsis cordata* Mx.)

AMPELOPSIS Mx. Leaves digitate. Flower clusters cymose. Calyx slightly 5-toothed. Petals 5, thick, spreading. Stamens 5. Tendrils attaching by sucker-like disks.

A. quinquefolia Mx. *Virginia Creeper.* Climbing by rootlets as well as by tendrils; leaflets stalked, oval to oblong-lanceolate, narrowed both ways, usually 5, serrate above the middle, dark green above, pale beneath, turning crimson in autumn. Thickets and low woods; July; fruit ripe in October; common. (*Parthenocissus quinquefolia* (L.) Planch.)

ACERACEAE St. Hil. MAPLE FAMILY.

Trees or shrubs, with opposite palmately lobed or pinnate leaves, and small regular unsymmetrical polygamous or dioecious flowers. Sepals and petals 5, the latter often wanting, imbricated in the bud. Stamens 5-10; filaments filiform. Ovary 2-lobed, 2-celled; styles 2, inserted between the lobes. Fruit of 2 winged samaras, joined below, 1-seeded. Represented in our flora by the genus **ACER** L, the maples.

* Leaves simple, palmately lobed; flowers polygamous.

A. saccharinum L. *Soft or White M.* Usually 40-100 feet high; leaves palmately 5-lobed, sinuses obtuse or acute, unequally toothed, silvery white beneath and more or less downy when young, base truncate; flowers appearing before the leaves, in umbel-like clusters, nearly sessile, greenish, apetalous; fruit with large divergent wings. Rich soil; March-April; common. (*A. dasycarpum* Ehrh.) A common grove tree. The sap yields small quantities of sugar.

A. saccharum Marsh. *Rock or Sugar M.* A large tree; leaves dark green above, pale beneath, 3-7-lobed, lobes sinuate, sinuses rounded and shallow, base subcordate; flowers appearing with the leaves, in terminal or lateral sessile corymbose clusters, apetalous, on drooping hairy pedicels; samaras glabrous, slightly diverging, the wings shorter than the preceding. River

bluffs; April; a frequent tree along the water courses of eastern and southern Iowa, extending far into the interior. Allamakee to Lee county, thence west as far as Decatur county. (*A. saccharinum* Wang.)

A. nigrum Mx. Similar to the preceding; leaves green both sides, pubescent beneath at least on the veins, lobes shorter, broader, but little undulate or often entire, sinuses very obtuse, the basal one nearly closed. With the preceding; Fayette, Story, Decatur and Emmet counties; infrequent or rare; often put as *var. nigrum* T. & G. of the preceding.

A. rubrum L. *Red or Swamp M.* Twigs reddish; leaves 3-5-lobed, lobes serrate, acuminate, green above, pale or whitish beneath, sinuses acute, base cordate; flowers reddish or yellowish, short pedicelled; petals linear-oblong; fruiting pedicels elongated. Low grounds along river; rare; Johnson county.

A. spicatum Lam. *Mountain M.* A shrub or small tree; leaves 3-5-lobed, glabrous above, pubescent beneath, coarsely serrate, lobes acuminate; flowers in a dense erect compound raceme, greenish yellow, appearing after the leaves; petals linear-spatulate; samaras small somewhat divergent. Bluffs of the Mississippi river; Allamakee, Clayton, and Dubuque counties; rather rare.

* * Leaves pinnate; flowers dioecious.

A. negundo L. *Bor Elder. Asi-leaved M.* Tree of average size; leaflets 3-5, ovate or oval, pubescent when young, becoming glabrous, acute, dentate or entire; flowers dioecious, appearing shortly before the leaves, drooping, small, apetalous; samaras glabrous somewhat incurved. Low woods; April; common. (*Negundo aceroides* Moench.)

HIPPOCASTANACEAE T. & G. BUCKEYE FAMILY.

Trees or shrubs, with opposite petioled digitately 5-7-foliate leaves, and irregular polygamous paniculate flowers. Calyx tubular, 5-toothed. Petals 4-5, unequal, clawed. Stamens 7, filaments slender, unequal. Ovary 3-celled, with 2 ovules in each cell. Fruit coriaceous, 3-celled, 3-valved, 3-seeded or by abortion 1-celled, 1-seeded. Represented by the genus **AESCRULUS** L.

AE. glabra Willd. *Ohio Buckeye.* Tree 10-40 feet high; bark fetid; leaves long-petioled; leaflets 5, ovate to lanceolate, acuminate, finely serrate; flowers in terminal thyrsoid panicles, pale yellow; petals 4; stamens curved, exserted; fruit globular, covered with prickles; seed large, shining, red; scar large, roundish, pale. Alluvial soil and rich uplands; May; frequent; Des Moines, Lee, Henry, Van Buren, Jefferson, Johnson, Boone, Polk, Appanoose, Decatur, Ringgold, Union, and Taylor counties.

AE. octandra Marsh. *Sweet B.* Flowers yellow; petals 4, conniving, long-clawed; stamens included; fruit smooth. May; Jasper county, reported by Prof. Shimek; apparently infrequent. (*AE. flava* Ait.)

STAPHYLEACEAE DC. BLADDER-NUT FAMILY.

Ours a small shrub, with 3-foliate stipulate leaves, and axillary drooping racemose flowers. Sepals, petals, and stamens 5. Styles 3. Pod large, membranous, inflated, 3-lobed, 3-celled, separating above, each cell with 1-4 bony seeds. Represented by the genus **STAPHYLEA** L.

S. trifolia L. *American Bladder-nut.* Shrub 4-12 feet high; flowers white. Moist woods; May; frequent throughout.

ANACARDIACEAE *Lindl.* SUMAC FAMILY.

Small trees or shrubs, with milky acrid juice, alternate odd-pinnate exstipulate leaves, and perfect or polygamous greenish or yellowish flowers. Sepals, petals, and stamens 5. Styles or stigmas 3. Fruit a small dry drupe. Represented by the genus *RHUS* L.

* *Flowers polygamous, in terminal thyrsoid panicles.*

R. typhina L. *Staghorn Sumac.* Tree 10-20 feet high; wood yellow, young branches densely villous; leaflets 11-31, sessile, lanceolate, acuminate, serrate, pale pubescent beneath; fruit red, with long crimson hairs. Wooded hillsides; May-June; frequent; Winneshiek, Allamakee, Clayton, Dubuque, Fayette, Jackson, Delaware, Scott, Jones, and Emmet counties. (*R. hirta* (L.) Sudw.)

R. glabra L. *Common S.* Shrub 3-15 feet high; branches smooth, somewhat glaucous; leaflets 11-31, sessile, lanceolate-oblong, acuminate, serrate, pale beneath; fruit red, with short crimson hairs. Open uplands, thickets; June; common.

* * *Flowers polygamous, in loose axillary panicles.*

R. radicans L. *Poison Oak. Poison Ivy.* Bushy, 1-2 feet high or else a woody vine, climbing high; leaflets 3, ovate, acuminate, entire, sinuate or somewhat lobed, more or less pubescent beneath; fruit globular, smooth, white or yellowish. Rich soil, waysides and thickets; June; common. Usually given as *R. toxicodendron* L.

* * * *Flowers polygamodioecious, appearing before the leaves, in terminal spicate clusters.*

R. canadensis Marsh. Shrub 2-6 feet high; leaflets 3, crenately toothed, pubescent when young, later glabrate, lateral ones ovate, sessile, terminal one ovate with a cuneate base, short stalked; fruit globose, red, pubescent. Rocky woods; April; frequent; Delaware, Muscatine, Lee, Henry, Wapello, Van Buren, Jefferson, and Linn counties. (*R. aromatica* Ait.)

POLYGALACEAE *Richenb.* MILKWORT FAMILY.

Ours herbs, with simple entire alternate, opposite or verticillate exstipulate leaves, and mostly racemose, spicate, or axillary flowers. Pedicels frequently 2-bracted at the base. Flowers perfect, irregular. Sepals 5, the upper and 2 lower small and often greenish, the 2 lateral large, colored. Petals 3, united into a split tube, more or less adnate to the stamens. Stamens 6 or 8, monodelphous or diadelphous; anthers 1-celled, opening at the apex by a hole or chink. Ovary 2-celled, 2-ovuled; style simple. Fruit a 2-celled 2-seeded capsule. Seeds usually caruncled and hairy. Represented in our flora by the genus *POLYGALA* L.

P. senega L. *Seneca Snakeroot.* Perennial; glabrous or nearly so; rootstocks hard, knotty; stems several; 6-12 inches high; leaves lanceolate or oblong-lanceolate, alternate, sessile, lower small, scale-like; flowers white, in a solitary close spike; wings round-ovate. Rocky woods; May-June; frequent; Winneshiek, Fayette, Scott, Muscatine, Johnson, Story, and Cerro Gordo counties.

P. sanguinea L. Annual; stem mostly simple, 6-15 inches high, glabrous; leaves oblong-linear, alternate, sessile; flowers in a globular or oblong head, rose-purple, greenish, rarely white; wings broadly ovate, sessile, exceeding the pod. Moist prairies; June-September; common. (*P. viridescens* L.)

P. incarnata L. Annual, glaucous; stem simple, slender; leaves distant,

sessile, linear or subulate; flowers pink or rose, in a dense terminal spike. Sandy moist soil, July-August; infrequent; Fayette, Muscatine, Johnson, and Story counties.

P. cruciata L. Annual; stem 4-10 inches high, square or slightly wing-angled, with spreading branches; leaves mostly in 4's, linear or oblanceolate; spikes sessile or nearly so; flowers purple, greenish, or white; wings triangular-ovate, slightly cordate, awn-pointed. In mossy shaded places; July-September; Lake township, Muscatine county.

P. verticillata L. Annual, glabrous; stems 4-12 inches high, branches mostly opposite, spreading; leaves in whorls of 4 or 5, a few scattered, acute, punctate, linear; spikes long-peduncled; flowers purplish or greenish; wings broadly oval, clawed, shorter than the pod. Prairies and open woods; June-September; common.

PAPILIONACEAE L. PEA FAMILY.

Trees, shrubs, vines or herbs, with alternate compound, stipulate leaves, and papilionaceous perfect flowers in spikes, heads, panicles or racemes. Calyx of 5 sepals, often unequal, more or less united. Corolla of 5 petals; the upper one known as the standard is the largest and in the bud encloses the others, usually reflexed; the lateral petals or wings are oblique and exterior to the two lower petals; the lower more or less conniving by their edges to form the keel which encloses the stamens and pistil. Stamens monodelphous, diadelphous or distinct, 10, rarely 9 or 5. Ovary simple, superior, usually 1-celled; style simple. Fruit a legume, 2-valved, 1-many seeded, dehiscent or indehiscent, or else a loment. This and the following two families are usually included under LEGUMINOSAE.

Tribe *Podalyriace*. Leaves 3-foliate; stamens distinct.

BAPTISIA. A single genus in our area.

Tribe *Genistace*. Leaves digitate or simple; stamens monodelphous; anthers of 2 kinds.

CROTALARIA. Leaves simple; calyx nearly equally 5-lobed.

LUPINUS. Leaves digitate; calyx deeply 2-lipped.

Tribe *Trifolie*. Leaves 3-foliate, leaflets denticulate; stamens diadelphous.

TRIFOLIUM. Flowers capitate; pods straight.

MELLITOTUS. Flowers racemose; pods coriaceous.

MEDICAGO. Flowers racemose or spicate; pods curved or coiled.

Tribe *Lote*. Leaves 3-foliate, leaflets entire; stamens diadelphous.

HOSACKIA. With us the only genus.

Tribe *Psoralee*. Leaves glandular-dotted; stamens mostly monodelphous; pod small, indehiscent.

PSORALEA. Leaves digitately 3-5-foliate.

AMORPHA. Corolla of one petal, the standard.

DALEA. Wings and keel adnate to the middle of the cleft stamen tube.

PETALOSTEMON. Corolla nearly regular; stamens 5.

Tribe *Galege*. Leaves usually not dotted, pinnately several-foliate; flowers racemose; stamens mostly diadelphous.

TEPHROSIA. Herb; leaves odd-pinnate; pod flat.

ROBINIA. A small tree; leaves odd-pinnate.

ASTRAGALUS. Pod inflated, partly or entirely 2-celled.

OXYTROPIS. Stemless silky-pubescent herbs; keel pointed.

GLYCYYRRHIZA. Leaves scaly or dotted; pod covered with hooked prickles.

Tribe Hedysoreae. Herbs without tendrils, with pinnate leaves: pod a segment or rarely 1-seeded.

DESMERIA. Leaflets stipellate; flowers of one kind: pod several-pointed.

LESPEZIA. Leaflets not stipellate; flowers of 2 kinds: pod 1-2-pointed.

Tribe Vicioidae. Leaves evenly pinnate, terminating in tendrils.

VICIA. Whorls adherent to the keel; style bearded at the summit.

LATHYRUS. Whorls nearly free; style bearded along the inner sole.

Tribe Phaseoleoee Leaves odd-pinnate: twining or trailing plants.

APIOS. Twining; leaflets 5-7.

STROPHANTHUS. Leaflets 3; flowers in capitate clusters, keel of the corolla strongly incurved.

AMPHICRYPAE. Leaflets 3; flowers racemose, gamopetalous and apetalous.

BAPTISIA Vent. FALSE INDIGO. Ours perennial herbs, with palmately 3-foliate leaves which blacken in drying, and white or yellowish flowers in terminal or lateral racemes. Calyx 4-5-toothed. Petals 5, nearly distinct and about equal in length. Stamens 10, distinct. Pod stalked, roundish or oblong, inflated, pointed, many-seeded.

B. leucophaea Nutt. Stem 1-2 feet high, hairy, branches divergent; leaves sessile or nearly so, leaflets oblanceolate or spatulate, obtuse or acutish; stipules and bracts large, leafy, persistent; flowers in a long reclined raceme, white or yellowish; pedicels slender; pod short stalked, hairy, with a long recurved apical point. Prairies and pastures: May: common. (*B. bracteata* Ell.)

B. leucantha T. & G. Stem smooth, 1-3 feet high, much branched; leaves petioled; leaflets obovate or oblanceolate, obtuse; stipules lanceolate, usually a little shorter than the petioles, deciduous; raceme elongated, loosely flowered; flowers white; pod ellipsoidal, long-stalked, tipped with a subulate style. Low grounds; June-July; common.

B. tinctoria (L.) R. Br. Plant glabrous; flowers yellow, in numerous terminal racemes; pods ovoid to nearly globose, tipped with a subulate style. Reported from Johnson county by Prof. Shimek.

CROTALARIA L. Herbs, with simple leaves and yellow flowers on long peduncles which are 2-4-flowered. Calyx 5-cleft, slightly 2-lipped. Standard large, cordate; keel scythe-shaped; sheath of the stamens cleft on the upper side; 5 of the anthers smaller; pod inflated, with many loose seeds.

C. sagittalis L. Rattle-box. Annual, 1 foot high or less, hairy, branched; leaves sessile or nearly so, entire, oval, oblong or lanceolate, stipules acuminate, united, decurrent; corolla equal or shorter than the calyx. Sandy soil, along water courses or dry uplands; June-September; frequent; Muscatine, Johnson, Woodbury, and Fremont counties.

LUPINUS L. Herbs, with palmately many-foliate leaves, and terminal racemose flowers. Calyx deeply 2-lipped, upper lip 2-cleft, lower entire or 3-toothed; standard reflexed laterally; keel crescent shaped; stamens monodelphous, sheath entire; anthers alternately oblong or globose; pod knotty, oblong, compressed.

L. perennis L. Wild Lupine. Perennial; stem 1-2 feet high, more or less pubescent; leaves 5-9-foliate, leaflets oblanceolate, mucronate; flowers in a long raceme, purplish blue to white, showy; pod linear-oblong, hairy, 5-6-seeded. May-June; Winneshiek county.

TRIFOLIUM L. CLOVER. Herbs, with 3-foliate denticulate leaves, and capitate or spicate flowers. Stipules large, adnate to the petiole. Calyx 5-toothed, persistent, teeth nearly equal. Corolla withering or persistent;

petals united at the base; standard oblong or obovate, reflexed. Stamens diadelphous, 9 and 1; pod included in the calyx or scarcely longer, 1-5-seeded.

T. pratense L. *Red C.* Perennial; stems ascending, somewhat pubescent; leaflets oval or obovate, obtuse or emarginate, with a pale spot on the upper surface; stipules large, bristle pointed; heads globular, sessile; flowers rose purple, sweet scented; lower tooth of the calyx longer than the 4 other equal ones. Meadows; May-September; common.

T. repens L. *White C.* Perennial, low, creeping; leaves long-petioled; leaflets obocordate, minutely toothed; stipules narrow, scarious; flowers in a long-peduncled globular head, white; calyx small, teeth short; corolla twice the length of the calyx. Fields and waste places; May-September; common.

T. hybridum L. *Alsike C.* Perennial, stems erect or suberect, somewhat pubescent; leaflets much as in *T. repens*; flowers rose-tinted. Fields and waste places; May-September; frequent.

T. reflexum L. *Buffalo C.* Annual or biennial, erect or procumbent, glabrous or pubescent; leaflets obovate or ovate-oblong; stipules foliaceous, ovate-acuminate; flowers in a large head, slender pedicelled, at length reflexed; calyx short; calyx-teeth very long and narrow; standard rose-red, wings and keel whitish. Sandy soil near river banks; April-August; infrequent; Muscatine, Johnson, Benton, Clinton, and Union counties.

T. stoloniferum Muhl. Perennial; glabrous, with long basal runners; leaflets obovate or obocordate; stipules ovate-lanceolate, membranous; flowers white, with a purplish tinge. Reported from Woodbury county.

T. arvense L. Annual, silky, about 8 inches high, simple or branched; leaflets oblanceolate; heads oblong; calyx-teeth bristle-like, plumose; petals whitish. Fields; infrequent; Winneshiek and Story counties.

T. agrarium L. *Yellow C.* Annual, six inches or more high, upright; leaflets obovate or oblong; stipules linear-lanceolate; flowers in oblong or oval heads, yellow. Waste places; infrequent; Story county.

T. procumbens L. *Low Hop C.* Annual, 3-6 inches high, procumbent or ascending, pubescent; leaflets cuneate-obovate; stipules ovate; heads globose, yellow. Meadows and pastures; infrequent; Fayette, Johnson, Lee, Story, and Winnebago counties.

MELILOTUS Juss. Biennial smooth herbs, with 3-foliate petioled leaves, dentate leaflets; subulate stipules, and small flowers in slender spike-like racemes. Calyx small, 5-cleft; teeth short, nearly equal. Corolla about twice the length of the calyx. Stamens diadelphous. Pod longer than the calyx, ovoid, wrinkled, coriaceous, 1-2-seeded.

M. alba Desv. *White Mellot. Sweet Clover.* Stem 2-6 feet high; leaflets oblong or oblanceolate; flowers white, standard longer than the other petals. Waste places; June-September; becoming common.

M. officinalis (L.) Lam. *Yellow M.* Resembling the preceding; leaflets ovate, oblong, or oblanceolate; flowers yellow, standard about equaling the wings and keel. Waste places; infrequent.

MEDICAGO L. Leaves pinnately 3-foliate, petioled; leaflets denticulate. Calyx 5-cleft. Stamens diadelphous, 9 and 1. Pod 1-several seeded, incurved or coiled.

M. sativa L. *Lucerne. Alfalfa.* Perennial, suberect, glabrous; leaflets ovate or oblanceolate; stipules lance-linear; raceme few flowered; flowers violet-purple; pod spirally coiled. Waste places; June-September; infrequent, widely distributed.

M. lupulina L. Annual, pubescent; leaflets obovate, oval or orbicular; stipules dentate; flowers yellow, small; pod 1-seeded, curved into a partial spire. Reported from Story county.

HOSACKIA Douglas. Ours an annual herb, with 1-3-foliate leaves and rose-colored flowers. Calyx-teeth nearly equal. Petals free from the stamen tube; standard ovate to roundish, claw remote; wings oblong or obovate; keel incurved. Stamens diadelphous, 9 and 1; anthers all alike.

H. purshiana Benth. Stem 1-2 feet high, branched, more or less villous-pubescent; leaves sessile or nearly so, leaflets usually 3, ovate to lanceolate; peduncles axillary, 1-flowered; pods linear, about 1 inch long, 4-7-seeded. Dry soil; June-July; infrequent; Henry, Boone, Lyon, and Woodbury counties.

PSORALEA L. Herbs, with usually glandular-dotted 3-5-foliate leaves, and spiked or paniced flowers. Calyx 5-cleft, campanulate, persistent, the lower lobe the longest. Stamens monodelphous or diadelphous. Pod about the length of the calyx, 1-seeded, indehiscent.

P. esculenta Pursh. *Prairie Apple*. Stem 5-9 inches high, very hairy, from a turnip-shaped farinaceous root; leaves palmately 5-foliate; leaflets entire, oval or obovate, nearly smooth above but hairy below; spike short, dense, long-peduncled; lobes of the calyx and the bracts lanceolate, corolla but little exceeding the calyx, standard ovate, reflexed, wings attached to the middle of the keel; flowers bluish. Prairies; May-June; frequent; Emmet, Lyon, Shelby, Pottawattomie, and Fremont counties.

P. argophylla Pursh. Stem 1-3 feet high, clothed with silky white hairs; leaves usually 3-foliate; leaflets oval, oblong or obovate; flowers in interrupted spikes; calyx and bracts lanceolate. Prairies; common in the western half of the state; June-August.

P. tenuiflora Pursh. Stem slender, erect, 2-4 feet high, much-branched, appressed pubescent; leaves palmately 3-5-foliate; leaflets linear, oblong or oval; racemes loosely few flowered; Prairies; June-August; frequent; Decatur, Union, and Ringgold counties.

AMORPHA L. Low perennial shrubs, with odd-pinnate glandular-punctate leaves, the leaflets stipellate, midvein excurrent, and bluish or purplish flowers in dense terminal clustered spikes. Calyx 5-toothed. Standard enveloping the stamens and style; wings and keel wanting. Stamens 10, exserted, monodelphous at the base. Pod oblong, longer than the calyx, beaked.

A. fruticosa L. *Willow Herb. False Indigo*. Shrub 4-7 feet high, somewhat pubescent or glabrate, leaves petioled, 9-19, oval or oblong, obtuse, not crowded, short-stalked; pod 2-seeded. Common along streams; May-June.

A. canescens Pursh. *Lead Plant*. Stems about a foot high, clothed with a white velvety pubescence; leaves sessile; leaflets 21-49, crowded, nearly sessile; pod 1-seeded. Common in dry soil, prairies; June-August.

A. microphylla Pursh. Stems a foot high or less, nearly glabrous, spike solitary or few in a cluster. Prairies and upland woods; May; Emmet, Cerro Gordo, Palo Alto, Clay, Dickinson, Delaware, Louisa, and Decatur counties. (*A. nama* Nutt.)

DALEA L. Herbs, with odd-pinnate glandular-punctate leaves, minute stipules, and small flowers in terminal spikes or heads. Calyx 5-toothed or cleft, teeth about equal. Standard cordate, inserted in the bottom of the calyx; wings and keel adnate to the center of the cleft stamen tube. Stamens 9 or 10. Pod 1-seeded, enclosed in the calyx.

D. alopecuroides Willd. Stem erect, 1-3 feet high, glabrous; leaflets 15-41, oblanceolate or oblong; calyx densely villous, teeth linear-lanceolate, plumose. Roadsides and waste places; July-September; frequent. (*Puroselia dalea* (L.) Britton.)

D. laxiflora Pursh. Stem 1-4 feet high, from a long thick root, smooth, much branched; leaflets 5-11, linear-oblong or linear; flowers in small loose spikes; calyx villous; teeth subulate, plumose; petals white; stamens 9. Loess hills; June-August; common in the west counties; Woodbury, Harrison, Monona, Pottawattomie, and Fremont counties. (*P. enneandra* (Nutt.) Britton.)

PETALOSTEMON Mx. **PRairie Clover.** Perennial herbs, with odd-pinnate leaves, minute stipules, and small flowers in peduncled oblong heads. Calyx 5-toothed. Sepals 5, much alike, 4 of them borne on the top of the cleft sheath of monodelphous filaments and alternate with the 5 anthers, the standard cordate or oblong, inserted in the bottom of the calyx.

P. violaceus Mx. Glabrous or somewhat pubescent; leaflets 5, narrowly linear; flowers in a dense globose or oblong head, violet purple. Prairies; July-August; common. (*Kuhnia purpurea* (Vent.) Mac M.)

P. candidus Mx. Glabrous; leaflets 7-9, lanceolate or oblong-linear; flowers in an oblong or cylindrical spike, white. With the last. (*K. candida* (Willd.) Kuntze.)

P. villosus Nutt. Decumbent or ascending, densely villous; leaflets 13-17, linear or oblong, spikes cylindric, villous; flowers rose-purple. Reported from Story county. (Hitchcock.) (*K. villosa* (Nutt.) Kuntze.)

TEPHROSIA Pers. Ours a perennial herb, with odd-pinnate non-punctate leaves, and flowers in a terminal often compound raceme. Calyx teeth 5, nearly equal; bractlets none. Petals clawed; standard large, orbicular, silky externally; keel bluntnish, cohering with the wings. Pod linear, flat, several-seeded.

T. virginiana Pers. *Goat's Rue. Catgut.* Stem 1-2 feet high, erect, hairy; leaflets 9-20, linear-oblong, mucronate, odd leaflet notched or obcordate and base cuneate; flowers yellowish white, marked with rose or purple, short-pedicelled, large, clustered; pod villous, bristle-pointed. Sandy soil; June-July; infrequent; Winneshiek, Allamakee, Fayette, Jackson, Delaware, Scott, Muscatine, Louisa, and Johnson counties. (*Cracca virginiana* L.)

ROBINIA L. Ours a small tree, with odd-pinnate leaves, spine-like stipules, and flowers in hanging axillary racemes. Calyx short, 5-toothed, 2 upper teeth more or less united. Standard large, reflexed, but little longer than the keel; wings free. Stamens diadelphous, 9 and 1. Pod linear, flat, several-seeded, margined.

R pseudacacia L. *False Acacia.* Leaflets ovate-oblong; flowers showy, fragrant, white; pod glabrous. Roadsides and waste places; May; an escape from cultivation, frequent in the older settlements.

ASTRAGALUS L. Perennial herbs, with odd-pinnate leaves, and racemose or spicate flowers. Calyx 5-toothed. Corolla slender, much exceeding the calyx; standard narrow, equaling or exceeding the obtuse keel, reflexed or spreading. Stamens diadelphous, 9 and 1. Pod varies, usually turgid, 2-valved, 1 or 2-celled, few-many-seeded.

* Pod 2-celled.

A. caryocarpus Ker. *Ground Plum.* Low, prostrate, whitish pubescent; root long, descending; leaflets 11-21, narrowly oblong; calyx tubular; corolla

twice as long, violet purple; flowers 6-10, in a spike-like raceme; pod thick, succulent, obovoid, corky when dry. Prairies; May; frequent; Fayette, Polk, Calhoun, Cerro Gordo, Story, Shelby, Emmet, Lyon, Woodbury, Pottawattomie, and Decatur counties. (*A. crassicarpus* Nutt.)

A. plattensis Nutt. Prostrate or ascending, villous; leaflets oblong or obovate; flowers yellowish-white, with purple tinge; pod ovoid, pubescent, not wrinkled. Reported from Harrison county. (Arthur.)

A. canadensis L. Stem 2-4 feet high, smooth or somewhat pubescent; leaflets 21-31, oblong-ovate or elliptical; flowers thickly set in an elongated spike, greenish yellow; pod oblong, glabrate, terete. Bank of streams; July-August; frequent throughout. (*A. carolinianus* L.)

** Pod 1-celled, sometimes partially 2-celled by intrusion of the sutures.

A. distortus T. & G. Low, diffuse or ascending, sub-glabrous; leaflets 11-25, obovate or oval, apex rounded or emarginate; flowers purple, in a short loose spike; pod sessile, glabrous, curved, grooved on the lower side. Muscatine county; reported from Scott county.

A. lotiflorus Hook. Nearly stemless, branched from the base, villous-pubescent with whitish hairs; leaflets 7-15, oval or oblong; flowers yellow, in dense short spikes; pod sessile, ovoid-oblong, pubescent. Lyon and Fremont counties. Fremont county specimens are low, 1-3-flowered; pods near the ground. Loess hills, frequent. These have been referred to *A. lotiflorus brachypus* Gray.

A. cooperi Gray. Stem 1-2 feet high, glabrous; leaflets 9-21, oblong or elliptic, apex obtuse or emarginate; flowers short-pedicelled; pod sessile. Reported from Lee county. (Arthur.) (*Phaca neglecta* T. & G.)

OXYTROPIS DC. Mostly stemless herbs, with odd-pinnate leaves, and racemose or spicate flowers on scape-like peduncles. Calyx-teeth nearly equal. Petals clawed; keel pointed or appendaged. Stamens diadelphous. Pod 2-valved, 1-celled or partially 2-celled.

O. lamberti Pursh. *Stemless Loco-Weed.* Silky-pubescent; stipules membranous, pubescent, lanceolate, imbricated; leaflets 9-19, linear or oblong; flowers purple or yellowish; pod coriaceous, ovoid-cylindric, pubescent, long-acuminate. Prairies; May-August; Lyon, Woodbury, and Fremont counties; found usually on the loess hills. (*Spesia lamberti* (Pursh) Kuntze.)

GLYCYRRHIZA L. Perennials; root large, sweet, descending. Leaves odd-pinnate; stipules small. Flowers in dense axillary spikes; anthers alternately smaller.

G. lepidota Nutt. *Wild Liquorice.* Stem 1-3 feet high, appressed pubescent; leaflets 15-19, ovate-oblong or lanceolate, scaly when young, dotted when old, mucronate; flowers whitish; pods oblong, covered with hooked prickles, few seeded. Fields and waste places; May-August; common in the west counties, spreading eastward.

DESMODIUM Desv. Perennial herbs, with stipellate 3-foliate leaves, scale-like stipules and bracts, and usually small flowers in axillary or terminal racemes or bracts. Calyx more or less 2-lipped, the upper with 2 and the lower with 3 teeth. Standard oblong, ovate or orbicular; wings obliquely oblong, adherent by a transverse appendage; keel straight or straightish, obtuse or truncate. Stamens monodelphous or diadelphous, 9 and 1. Ovary sessile or stalked; ovules 2-many. Pod sessile or stalked, flat, several jointed; joints readily separable, indehiscent or nearly so, mainly coriaceous, pubescent or muricate. (*MEIBOMIA* Adans.)

* *Pod long-stalked, not constricted above but deeply constricted below; stamens monodelphous below; leaves petioled.*

D. acuminatum DC. Stem erect, glabrous or somewhat pubescent, 1-4 feet high; leaves clustered at the summit of the stem; leaflets ovate, acuminate, remotely pubescent; stipules subulate, mostly persistent; peduncle arising from the cluster of leaves; panicle large, naked, bracts deciduous; flowers large, purple; pods 2-3-jointed. Rich woods; June-September; common. (*M. grandiflora* (Walt.) Kuntze.)

D. nudiflorum DC. Leaves crowded at the summit of the sterile stems; leaflets ovate or oval, acuminate or bluntnish; peduncle elongated, arising from the base of the plant; panicle narrow, the few flowers rose-purple. Hilly woodlands; July-August; infrequent; Muscatine and Cedar counties. (*M. nudiflora* (L.) Kuntze.)

** *Pod constricted on both margins, more deeply below than above; leaves petioled.*

† *Joints of the pod longer than broad; stipe about the length of the calyx-lobes.*

D. canescens DC. Stem much branched, 3-5 feet high, hairy; leaflets ovate, acutish or obtuse, equaling the petioles, scabrous above, whitish and somewhat pubescent beneath, ciliate; stipules ovate, acuminate, persistent; pods 4-6-jointed, joints unequally rhomboidal, longer than wide. Rich soil; July-September; infrequent; Muscatine, Johnson, and Lee counties. (*M. canescens* (L.) Kuntze.)

D. longifolia (T. & G.) Stem 2-5 feet high, angled, branched, minutely pubescent; leaves petioled; leaflets ovate or ovate-lanceolate, long-acuminate, scarabate above, slightly villous beneath; pods with 4-6 triangular-oblong or lozenge-shaped joints. Woods; July-August; infrequent; Decatur and Page counties. (*M. longifolia* (T. & G.) Vail.)

D. cuspidatum T. & G. Stem 3-6 feet high mostly glabrous below, finely pubescent above; leaflets ovate or ovate-lanceolate, long-acuminate, glabrous, above, glaucous beneath; pods 3-7-jointed, joints obliquely oblong, twice as long as wide. Reported by Arthur as belonging to the flora of Iowa. (*M. bracteosa* (Mx.) Kuntze.)

† † *Pod sessile or nearly so; joints oval.*

D. illinoense Gray. Stem erect, 2-4 feet high, uncinate-pubescent; leaflets lanceolate or ovate-lanceolate, bluntnish, coriaceous, scabrous above, strongly reticulated and cinereous beneath; stipules ovate, acute, persistent; pods of 3-6 oval or orbicular joints. Dry soil, prairies and woods; June-September; frequent; Fayette, Muscatine, Henry, Story, Decatur, Page, and Ringgold counties.

† † † *Pods long-stalked; joints little longer than broad.*

D. dillenii Darl. Stem 2-3 feet high, glabrous or pubescent; leaflets thin, oval to oblong-ovate, obtuse, pubescent or villous beneath; stipules small, subulate; pods of 2-4 triangular joints; stipes shorter than the calyx lobes. Borders of upland woods; June-August; frequent; forms have been referred to this species from Jones, Muscatine, Lee, Johnson, Story, Chickasaw, and Fremont counties. (*M. dillenii* (Darl.) Kuntze.)

D. paniculatum DC. Stem nearly glabrous, 2-4 feet high; leaflets oblong-lanceolate or linear-lanceolate, obtuse, thin; stipules small, subulate, deciduous; pods of 4-6 obliquely triangular or rhomboidal joints. Dry woods; July-September; infrequent; Fayette, Johnson, Des Moines, Van Buren, Decatur, and Fremont counties. (*M. paniculatum* (L.) Kuntze.)

† † † Pod sessile or nearly so; joints roundish-triangular.

D. canadense DC. Stem 2-8 feet high, pubescent; leaves petioled, the upper nearly sessile; stipules linear-lanceolate, persistent; leaflets oblong or ovate-lanceolate, obtuse, glabrous or roughish above, appressed pubescent beneath; flowers showy, larger than in any other species; pods numerous; joints triangular, back straight or convex. Upland woods; July-September; frequent. (*M. canadense* (L.) Kuntze.)

* * * Leaves sessile or nearly so.

D. sessilifolium T. & G. Stem 2-4 feet high, pubescent; leaflets thickish, linear or linear-oblong, obtuse at each end, nearly glabrous above, pubescent beneath; flowers small; panicle with long branches; pods with 1-3 obliquely obovate hispid joints. Prairies, infrequent; Fayette county (Fink); copses, abundant, Story county (Hitchcock); July-September. (*M. sessilifolia* (Torr.) Kuntze.)

LESPEDEZA Mx. BUSH CLOVER. Perennial herbs, with pinnately 3-foliate leaves, small stipules, and small flowers in axillary clusters, heads or panicles. Calyx 5-cleft, the lobes about equal. Stamens diadelphous, 9 and 1; anthers equal. Pod short, oval or ovoid, reticulated.

L. capitata Mx. Stem 2-4 feet high, hairy; leaves short-petioled; leaflets oblong or oval, smooth above, hairy or woolly below; flowers in short globular heads, on peduncles shorter than the leaves; pod shorter than the calyx, pubescent. Prairies; July-August; common.

L. leptostachya Engelm. Stem 1-3 feet high, simple or branched, silvery-pubescent; leaflets linear to narrowly oblong; spikes slender, loosely flowered, peduncles equaling or exceeding the leaves; pod ovate, pubescent, about equaling the calyx. Prairies; August-September; Emmet county, reported from Winneshiek, Fayette, Webster, Floyd, Story, and Lyon counties.

L. violacea (L.) Pers. Stems sparingly pubescent, clustered and mostly spreading; petioles slender, as long as the leaflets; leaflets ovate or elliptical, smooth above, minutely pubescent beneath; flowers several, in a loose panicle, violet-purple; pod ovate, nearly glabrous. Dry soil; August-September; frequent; Scott, Muscatine, Henry, Lee, Johnson, Van Buren, Appanoose, Decatur, Ringgold, and Page counties.

L. reticulata Pers. Stem erect, simple or branched; leaflets linear or linear-oblong, glabrate or pubescent beneath; flowers in dense axillary clusters, violet-purple; pod ovate, acute, glabrous or somewhat pubescent. Dry soil, woods; August; infrequent; Muscatine and Decatur counties. (*L. virginica* (L.) Britton).

VICIA L. Trailing or climbing herbs, with pinnate leaves terminating in tendrils, semi-sagittate stipules, and axillary pedunculate flowers. Calyx campanulate, 5-toothed, teeth nearly equal. Wings cohering to the middle of the keel. Stamens diadelphous, 9 and 1. Style slender, bent at right angles to the ovary, villous at the apex. Pod 2-valved, flat, 2-several-seeded.

* Perennial; peduncle elongated, many-flowered.

V. americana Muhl. Stem glabrous, 2-3 feet long; stipules triangular-ovate, sharply dentate; leaflets 8-14, elliptic, ovate or oblong, obtuse, slightly mucronate; corolla purplish, one-half inch long; peduncles 4-8-flowered. Rich soil, banks and woods; May-June; Winneshiek, Allamakee, Fayette, Linn, Story, Shelby, Cerro Gordo, Emmet, Lyon, and Pottawattomie counties. Some forms approach the variety *truncata* (Nutt.) Brewer, which has the leaves truncate and dentate at the apex.

V. cracca L. Plant pubescent or rarely glabrous; spike-like racemes dense, 15-40-flowered; stipules linear, entire, acute; leaflets linear or linear-oblong. Rare; reported from Story county.

V. caroliniana Walt. Glabrous or nearly so; stipules linear or oblong, entire; leaflets oblong, obtuse; peduncles loosely flowered; flowers smaller than the preceding. River banks; rare; reported from Fayette county.

* * Annual; flowers nearly sessile, 1 or 2 in the axils.

V. angustifolia Roth. Glabrous or puberulent; stipules semi-sagittate, toothed or entire; leaflets linear, lanceolate, or oblanceolate, apex acute, truncate, or emarginate, mucronulate; pod linear, 1-2 inches long. One specimen in my collection from Winneshiek county, probably rare, introduced.

LATHYRUS L. Ours perennial climbing vines, with pinnate leaves terminating in tendrils, and solitary racemose flowers. Calyx campanulate, 5-toothed, the 2 upper teeth shorter. Wings nearly free. Stamens diadelphous, 9 and 1. Style bent at right angles to the ovary, flattish, dilated above, pubescent next the free stamen.

L. palustris L. Stem smooth or slightly pubescent, winged; stipules large, semi-sagittate, acute; leaflets 2-5 pairs, narrowly oblong to linear; flowers purple, 2-6 to each peduncle, half-inch long. Thickets; June-July; frequent; Fayette, Muscatine, Johnson, Story, Hamilton, Emmet, Lyon, and Page counties.

L. venosus Muhl. Stem firm, pubescent or glabrous, 4-angled; stipules small, slender, acute, semi-sagittate; leaflets 5-7 pairs, broadly ovate, obtuse, mucronulate; peduncles shorter than the leaves, 10-16-flowered. Wooded hillsides and banks; June-July; frequent; Winneshiek, Fayette, Scott, Floyd, Winnebago, Story, Cerro Gordo, Dickinson, Emmet, and Lyon counties.

L. ochroleucus Hook. Glabrous, somewhat glaucous; stipules large, foliaceous, semi-ovate and semi-sagittate; leaflets 3-5 pairs, ovate or oval, thin, pale beneath; flowers yellowish-white. Borders; May-July; rare; Emmet county, reported from Fayette county.

APIOS Boerhaave. Ours a perennial vine, with milky juice, twining over bushes, bearing edible tubers, with pinnately 5-7-foliate leaves, minute stipules, and rather large purplish flowers in axillary racemes.

A. tuberosa Moench. Flowers in dense short racemes, brown purple, violet-scented. Rich soil, moist thickets; July-September; common; Allamakee, Scott, Muscatine, Lee, Johnson, Linn, Story, Emmet, Woodbury, Decatur, Ringgold, Taylor, and Fremont counties. (*A. apios* (L.) Mac M.)

STROPHOSTYLES Ell. Ours annual prostrate or climbing plants, with 3-foliate leaves, and flowers in capitate long-peduncled axillary clusters. Calyx 5-toothed, the 2 upper teeth more or less united. Corolla with the included stamens and style elongated, incurved. Stamens diadelphous, 9 and 1. Pod linear, elongated, nearly terete or somewhat compressed.

S. angulosa Ell. Stems 2-6 feet long, branched, retrorsely hairy; leaflets oblong-ovate, with one or the terminal with two rounded lobes near the base; pod obscurely hairy, terete, 2-3 inches long; seed quadrate, $\frac{1}{4}$ inch long, truncate, pubescent, mealy. Sandy soil; July-September; common. (*S. helveola* (L.) Britton.)

S. pauciflora (Benth.) Wats. Low, pubescent; leaflets few, oblong-linear to linear, not lobed; pod pubescent, flattish, 1-1 $\frac{1}{2}$ inches long; seeds as in the last. Sandy soil; August-September; frequent; Muscatine, Wapello, Fremont, Dickinson, and Lyon counties.

AMPHICARPAEA Ell. Trailing perennials from ovate tubers, with pinnately 3-foliate long-petioled leaves, and perfect flowers in axillary racemes or solitary apetalous ones in the lower axils or on slender creeping branches. Calyx 4-5-cleft; bracts minute or none. Standard obovate, enfolding the other petals; keel and wings straightish, similar. Stamens diadelphous, 9 and 1. Style beardless. Pods of the upper flowers, flat, recurved, short-stalked, 2-3-seeded; those of the lower flowers underground, fleshy, globose, 1-seeded.

A. monoica Nutt. Pubescent or glabrate; leaflets ovate, thin, $\frac{1}{4}$ -2 inches long; stipules small, ovate; racemes nodding, purple; calyx short; pod an inch long, $\frac{1}{4}$ inch wide, hairy on the margin. Rich woodlands; August-September; frequent. (*Fulcata canosa* (L.) Kuntze.)

A. pitcheri T. & G. Villous-brown-pubescent; leaflets 2-4 inches long; pods of the large flowers frequent, pubescent, subterranean pods infrequent. Rich woodlands; August-September; frequent. (*F. pitcheri* (T. & G.) Kuntze.)

CAESALPINACEAE Kl. & Garcke. SENNA FAMILY.

Trees, shrubs or herbs, with alternate simple or compound leaves, and regular or irregular monoecious, dioecious or polygamous flowers. Calyx mostly 5-toothed or 5-parted. Petals 5, the upper enclosed by the lateral in the bud. Stamens 10 or fewer; filaments distinct or somewhat united. Fruit a legume, dehiscent into two valves.

CERCIS. Trees, with simple leaves, perfect roseate apparently papilionaceous flowers, and flat wing-margined pods.

CASSIA. Herbs, with pinnate leaves, and nearly regular perfect flowers.

GYNNOCLADUS. Trees, with bipinnate leaves, and regular polygamous or dioecious flowers. Stamens 10.

GLEDTISCHIA. Thorny trees, with 1-2 pinnate leaves, and greenish polygamous flowers. Sepals, petals, and stamens 3-5.

CERCIS L. Leaves large, ovate-cordate. Flowers reddish-purple, clustered, appearing before the leaves, on old branches. Calyx persistent, 5-toothed. Corolla imperfectly papilionaceous; wings larger than the standard and enveloping it; lower petals large, free. Pods 2-3 inches long, $\frac{1}{4}$ - $\frac{1}{2}$ inch wide, wing-inmargined on the upper suture.

C. canadensis L. Leaves pointed, entire, petioles somewhat shorter than the leaves; pods flat, many-seeded, veiny, nearly sessile. A small tree frequent along water courses, preferring the bluffs; April-May; Scott, Muscatine, Louisa, Des Moines, Lee, Henry, Van Buren, Jefferson, Johnson, Appanoose, Polk, Decatur, and Fremont counties.

CASSIA L. Herbs, with abruptly pinnate leaves, and mostly yellow flowers. Sepals 5, nearly equal, scarcely united at the base. Petals 5, unequal, but not papilionaceous, spreading. Stamens normally 10, sometimes fewer by abortion, often unequal; anthers opening by two terminal pores. Pods flat, 1-celled, many-seeded.

C. charmaecrista L. *Partridge Pea.* Annual, stem 1 foot high, much branched; leaflets 10-15 pairs, oblique at the base, sessile or nearly so, linear-oblong, obtuse, mucronate, a cup shaped gland situated on the petiole below the first pair of leaflets; stipules lanceolate, striate, persistent; flowers large, on slender pedicels; 2 or 3 of the petals with a purple spot at the base; anthers 10, unequal, elongated, 4 yellow, 6 purple. Sandy soil, fields and waste places; July-August; common.

C. Marylandica L. *Wild Senna.* Perennial, stem 3-4 feet high; leaflets 6-9 pairs, short-stalked, oblong-lanceolate, obtuse, mucronate, a club-shaped

gland near the base of the petiole; stipules deciduous; flowers in a raceme; stamens 10, 3 upper small, imperfect; pod curved, 10-20-seeded. Low grounds; July-August; infrequent; Dubuque, Scott, Muscatine, Louisa, Linn, Appanoose, Ringgold, Page, and Fremont counties.

C. tora L. *Low Senna*. Annual; leaflets 2-4 pairs, obovate, gland between or above lowest pair; pod long and slender, strongly curved. Reported from Story county; introduced.

GYMNOCLADUS Lam. Flowers dioecious or polygamous, regular, in terminal racemes. Calyx tubular, 5-cleft, divisions linear. Petals equal, oblong, inserted on the calyx tube. Stamens 10, distinct, alternately shorter, inserted with the petals, included. Pod large, compressed, oblong, 4-8 inches long, 2 inches wide, tough, pulpy within, several-seeded.

G. canadensis Lam. *Kentucky Coffee-tree*. A large tree, with rough grayish bark, and a large pith-like center; leaves unequally bipinnate, the lower two pairs of pinnae of single leaflets, the upper of 7-13 ovate acuminate leaflets; stipules none, seeds $\frac{1}{4}$ an inch in diameter, polished. Rich soil; May-June; locally infrequent throughout the state; Allamakee, Clayton, Dubuque, Fayette, Delaware, Scott, Muscatine, Louisa, Lee, Johnson, Henry, Story, Dallas, Decatur, Fremont, Pottawattomie, Shelby, and Woodbury counties.

GLEBITSCHIA L. Trees, with pinnate or bipinnate leaves, and usually well developed thorns above the axils. Flowers polygamous, small, greenish, in spike-like racemes. Sepals 3-5, spreading, united at the base. Petals 3-5, equal in length to the sepals, the two lower sometimes united. Stamens 3-5, opposite the sepals. Pod compressed, continuous, usually pulpy between the seeds. Seeds flat.

G. triacanthos L. *Honey Locust*. A large tree; spines branched; leaflets lanceolate-oblong, alternate, obscurely serrate, pod a foot or more in length and fully an inch in width, flat, linear-oblong, often twisted, hanging, inter-spaces filled with a sweetish pulp; seeds flattened, globose, dark. Rich woods; June; frequent throughout the state.

MIMOSACEAE Richenb. MIMOSA FAMILY.

Ours a perennial herb, with alternate bipinnate leaves, small stipules, and small regular perfect greenish flowers in pedunculate axillary heads. Represented by the genus *DESMANTHUS* Willd.

D. brachylobus Benth. Stem angled, glabrous or nearly so, 1-4 feet high; pinnae and leaflets numerous; calyx campanulate, 5-toothed; petals 5, distinct; stamens 5, distinct; pods many, in a dense globose head, flat, linear, curved, 2-valved, several-seeded. Alluvial soil; June-August; frequent; Dickinson, Calhoun, and Fremont counties.

DRUPACEAE DC. PLUM FAMILY.

Trees or shrubs, with alternate petioled serrate leaves, and regular mostly perfect flowers which are solitary or variously clustered. The bark exudes a gum and the leaves, seed, and bark contain a bitter principle called prussic acid. Calyx inferior, deciduous, 5 lobed, the lobes imbricated in the bud. Petals 5, inserted along with the many stamens on the calyx. Style simple, stigma small, capitate. Ovary 1-celled, 2-ovuled. Fruit a drupe. Often included with the following family.

PRUNUS. Drupe glabrous; native species.

AMYGDALUS. Drupe velvety; introduced species.

PRUNUS L. **PLUM CHERRY.** Calyx 5-toothed, urn-shaped or campanulate, falling away after flowering. Petals 5. Stamens 15-20. Pistil 1. Ovary 1, with 2 pendulous ovules. Fruit a fleshy drupe, with a bony nucleus.

* *Flowers expanding before the leaves.*

P. americana Mars. *Wild Plum.* A shrub or small tree, 10-20 feet high, thorny; leaves oblong, ovate or obovate, serrate, sometimes doubly serrate, petioled, veiny; flowers in clusters, white, fragrant, fruit roundish, $\frac{1}{2}$ inch or more in diameter, yellowish or red, edible, skin tough. Flowers in April, fruit ripe in August; rich woods; common throughout the state.

** *Flowers expanding with the leaves.*

P. pennsylvanica L. f. *Wild Red Cherry.* A small tree, 15-30 feet high; leaves oblong-lanceolate, pointed, finely and sharply serrate, glabrous, shining on both sides; flowers white, in lateral corymbose leafless clusters; drupe globose, small, red, flesh sour. Woods; April-June; rare; Fayette county, reported from Story county.

*** *Flowers terminating leafy branches, appearing after the leaves.*

P. serotina Ehrh. *Wild Black Cherry.* Tree 20-30 feet or more high, branches reddish brown; leaves ovate-oblong or elliptical, taper pointed, serrate, teeth glandular, incurved; petioles with 2-4 glands; flowers small, white, in an elongated raceme; drupe small, black. Woods; May; common.

P. virginiana L. *Choke Cherry.* Shrub 4-15 feet high, bark grayish; leaves oval or obovate, short pointed, finely and sometimes doubly serrate, teeth slender, petioles with two glands; flowers white, in a short raceme; drupe small, red, turning dark. Woods; May; common; usually blooming a week or more before the preceding.

AMYGDALUS L. Represented in cultivation by the Peach.

A. persica L. This species is a not infrequent escape in southern Iowa. Waysides; April; Ringgold, Fayette, Page, and Fremont counties.

ROSACEAE B. Juss. ROSE FAMILY.

Trees, shrubs, or herbs, with alternate mostly stipulate simple or compound leaves, and regular perfect or polygamo-dioecious flowers. Calyx usually 5-lobed, free or adnate to the ovary, often with a row of bractlets. Petals usually 5, sometimes none. Stamens usually many, distinct, inserted with the petals on the edge of the disk which lines the calyx-tube. Carpels 1-many. Ovary 1-celled or imperfectly 2-celled; style lateral or terminal. Commonly includes the preceding and the following families.

* *Pistils usually 5, becoming 2-4-seeded follicles.*

SPIRAEA. Leaves simple or pinnate; flowers perfect or dioecious; pods 1-valved.

PHYSOCARPUS. Leaves palmately lobed; flowers perfect; pods 2-valved.

** *Pistils few or many, 2-ovuled, becoming 1-seeded drupelets.*

RUBUS. Pistils many; drupelets pulpy, crowded upon a spongy receptacle,

*** *Pistils few or many, 1-ovuled, becoming dry achenes.*

GRUM. Leaves interruptedly pinnate; styles persistent, often hairy or plumose.

FRAGARIA. Leaves 3-foliate; styles deciduous; receptacle enlarged and pulpy in fruit.

POTENTILLA. Leaves pinnately compound or digitate; calyx with a row of bractlets alternate with the calyx-lobes; stamens and achenes many; receptacle dry.

**** *Pistils 1-4, becoming achenes and enclosed in the dry persistent calyx-tube.*

AGRIMONIA. Flowers yellow, in long racemes; calyx bearing hooked prickles.

***** *Pistils many, becoming bony achenes and enclosed in a fleshy persistent pome-like calyx-tube.*

ROSA. Prickly shrubs or herbs; the only genus.

SPIRAEA L. Herbs or shrubs, with simple or pinnate leaves, and paniculate or corymbose flowers. Calyx 5-cleft, short. Petals 5, roundish. Stamens many. Carpels 5-8, 1-celled, 1-valved, 1-10-seeded, scarcely dehiscent or indehiscent.

S. salicifolia L. *Common Meadow-sweet.* Erect, 2-3 feet high, smooth, leafy; leaves sessile, lanceolate or oblanceolate, simply or doubly serrate; flowers white, perfect, in a dense panicle. Woods and meadows; July-August; widely distributed, frequent in the eastern counties, infrequent westward. Winnesiek, Fayette, Delaware, Jones, Scott, Muscatine, Johnson, Linn, Henry, Taylor, Page, Hancock, Cerro Gordo, Chickasaw, Winnebago, and Emmet counties.

S. aruncus L. *Goat's Beard.* A perennial glabrous herb, 3-7 feet high, with long-petioled 2-3 pinnate leaves; leaflets oval or lanceolate, sharply doubly serrate, and numerous white dioecious flowers in panicled spikes; stipules wanting; spikes slender, elongated. Rich woods; May-July; frequent; Clinton, Dubuque, Jackson, Muscatine, and Lee counties. (*Aruncus aruncus* (L.) Karst.)

S. lobata Jacq. *Queen-of-the-Prairie.* A perennial glabrous herb, 2-8 feet high, with large interruptedly pinnately 3-7-foliate leaves, and fragrant perfect pink or purple panicled or cymose flowers; stipules serrate, persistent, reniform; capsules glabrous, 1-seeded, indehiscent. Moist soil, prairies; June-July; reported from Muscatine county. (*Ulmaria rubra* Hill.)

PHYSOCAPPUS Maxim. Shrubs, with palmately lobed leaves, and corymbose white flowers. Calyx 5-cleft, persistent. Petals 5. Stamens many. Carpels 1-5, 2-valved, inflated, dehiscent.

P. opulifolius Maxim. *Ninebark.* Shrub 3-7 feet high, stems and branches slender, recurved, old bark loose and shreddy; leaves roundish, more or less 3-lobed, somewhat doubly serrate; calyx pubescent, corolla 2-3 times the length of the calyx, petals lance-oval. Rocky woods; June; infrequent; Winnesiek, Allamakee, Clayton, Fayette, Jackson, Jones, Muscatine, Henry, Johnson, Linn, and Decatur counties. (*Opulaster opulifolius* (L.) Kuntze.)

RUBUS. L. Perennial herbs or shrubs, upright or trailing, with alternate simple lobed or 3-7-foliate leaves, adnate stipules, and perfect rarely dioecious flowers which are solitary, racemose or panicled, usually white. Calyx persistent, 5-parted, bractless. Petals 5, deciduous. Stamens many, distinct, inserted on the calyx. Carpels many, inserted on a convex or elongated receptacle. Fruit an aggregation of drupelets, edible

R. occidentalis L. *Black Raspberry.* Very glaucous, stems long, slender, recurved, often rooting at the tip, sparingly armed with stout hooked prickles; leaflets usually 3, ovate, acuminate, white pubescent beneath, coarsely doubly serrate; petals shorter than the sepals; fruit purple-black. Thickets, fence ways; May-June, fruit ripe in July; common.

R. strigosus Mx. *Wild Red Raspberry.* A shrubby biennial; not glaucous; densely clothed with weak glandular bristles, the older stems with a few hooked prickles; leaflets 3 or 5; whitish pubescent beneath; sepals and petals about equal in length; fruit light red. Dry or rocky soil; May-July, fruit ripe in July-September; infrequent; Emmet, Fayette, Delaware, Johnson, Henry, Lee, Dallas, Woodbury, and Lyon counties.

R. triflorus Richardson. *Dwarf Raspberry.* A small herbaceous unarmed annual, 6-18 inches high or trailing; stipules oval, entire or few toothed; leaflets 3 or 5, rhombic-ovate, glabrous or nearly so; fruit red purple. Reported

from Winneshiek county. (*R. americanus* (Pers.) Britton.)

R. villosus Ait. *Common Blackberry*. A perennial shrub, branched, glandular-pubescent; stems 3-6 feet high, furrowed, erect or reclining, armed with stout recurved prickles; stipules linear or lanceolate; leaflets 3 or 5, ovate or ovate-oblong, coarsely serrate, pubescent beneath; flowers numerous, racemose, petals spreading, much exceeding the sepals; fruit black. Thickets; May-June, fruit ripe July-August; common.

R. baileyanus Britton. Intermediate; stem trailing or ascending, sparingly prickly; upper leaves unifoliate; leaflets ovate or oval, pubescent, base rounded or cordate. Forms from Decatur county referred to this species.

R. canadensis L. *Dewberry*. Shrubby, trailing, somewhat prickly; branches 4-12 inches long, erect or ascending; leaflets 3 or pedately 5-7, oval or ovate-lanceolate, thin, cut-serrate; fruit black. Dry soil, fields and woods; April-May, fruit ripe June-July; frequent; Clinton, Muscatine, Johnson, Henry, Apocanoose, and Decatur counties. The variety *invisus* Bailey, is stouter, partly ascending, leaflets larger, coarsely dentate, peduncles elongated. Dry soil; woods; Decatur county.

GEUM L. Perennial herbs, with odd-pinnate or pinnatifid leaves, and solitary or cymose-corymbose flowers. Calyx deeply 5-cleft, usually bracteolate. Petals 5, exceeding the calyx. Stamens many, inserted on a disk at the base of the calyx. Achenes many.

G. album Gmel. Stems 1-2½ feet high, glabrate to softly pubescent; stipules small, dentate; basal leaves long-petioled, 3-foliate or of 3-5 pinnately divided divisions, dentate, somewhat lobed; caudine-leaves short-petioled or sessile, 3-5-lobed or divided; flowers white; sepals lanceolate, reflexed; petals obovate, equalling or shorter than the sepals; head of fruit globose-ovoid, receptacle densely bristly-hirsute. Open woods, borders; June-August; frequent. (*G. canadense* Jacq.)

G. virginianum L. Similar to the preceding, stouter, bristly-hairy; peduncles pubescent with reflexed hairs; sepals reflexed; petals creamy-white, spreading, shorter than the sepals; receptacle glabrous or nearly so; style pubescent below. Low prairies, woods; June-July; infrequent; Fayette, Benton, Muscatine, Johnson, Decatur, Fremont, Story, Dickinson, and Lyon counties.

G. macrophyllum Willd. Stem stout, 1-3 feet high, bristly-hairy; stipules broad, foliaceous; basal leaves long-petioled; lyrate and interruptedly pinnate, terminal segment large, reniform to cordate, 3-7-lobed, lateral leaflets oval or obovate; stem-leaves short-petioled or sessile, lateral leaflets small, terminal roundish, 3-cleft, lobes cuneate-ovate, all leaflets dentate; flowers terminal, yellow; sepals reflexed, acute; petals obovate, exceeding the sepals; receptacle nearly glabrous; style pubescent below. Low grounds; May-July; infrequent; Winneshiek, Clinton, Winnebago, Cerro Gordo, and Pottawattomie counties.

G. strictum Ait. Similar to the preceding, pubescent; basal leaves interruptedly pinnate, terminal leaflet ovate or cuneate; stem-leaves of 3-5 rhombic-ovate or oblong acute leaflets; receptacle downy. Low grounds; June-August; reported from Fayette county.

G. triflorum Pursh. Hairy, scapose, 4-14 inches high; root-leaves interruptedly pinnate, divisions laciniate, scape-leaves 2 pairs, opposite; peduncles elongated, bractlets linear, exceeding the erect purple calyx-lobes; petals purple; styles long filiform, plumose in fruit. Prairies and open upland woods; May-June; infrequent; Winneshiek, Allamakee, and Fayette counties. (*G. cil-*

iatum Pursh.)

FRAGARIA L. STRAWBERRY. Stemless perennial stoloniferous hairy herbs, with trifoliolate radical leaves, and white scapose polygamo-dioecious flowers. Calyx deeply 5-cleft, with 5 narrow bractlets at the base of the sinus giving it the appearance of being 10-cleft. Petals 5, obovate. Stamens and styles many. Receptacle in fruit becoming globose or conical, pulpy, scarlet, bearing the dry achenes on or near the surface.

F. virginiana Duchesne. Stout, tufted, more or less villous-pubescent; leaflets obovate-cuneate, coriaceous, serrate; calyx becoming erect-spreading; achenes imbedded in pits of the oblong receptacle. Fields and woods; May-June; common.

F. vesca L. Fruiting receptacle conical, without pits; achenes projecting on the nearly even surface; fruiting calyx spreading or reflexed; leaflets thickish. Introduced; May; reported from several counties but is confused with the following species.

F. americana Porter. Villous-pubescent or glabrate, runners produced freely; leaflets thin, ovate or oval, the terminal cuneate-ovate, all incised-dentate; fruit ovoid or elongated-conic, reddish or pink, achenes borne on the even surface. Rocky woods; May-June; infrequent; forms from Winneshiek, Johnson, and Decatur counties referred to this species.

POTENTILLA L. Herbs or shrubs, with alternate stipulate compound leaves, and solitary or cymose flowers. Calyx 5-lobed, 5-bracteolate. Petals 5. Stamens many. Achenes many, collected in a head, on a dry usually pubescent or hairy receptacle.

* *Perennials; flowers white; style nearly basal.*

P. arguta Pursh. *Glandular Chinquefoil.* Stem 1-4 feet high, mostly simple, glandular and brownish-hairy; basal leaves petioled, pinnately 7-11-foliate, leaflets incised dentate, the lateral ovate, oval or rhomboid, the terminal one cuneate; stem-leaves short-petiolated or sessile, leaflets fewer; flowers white, cyme dense; stamens 25-30, borne on a thick glandular disk. Prairies; June-July; common.

** *Annual or biennial, flowers yellow; style terminal.*

† *Leaves not white tomentose; stamens 5-20.*

P. norvegica L. Annual or biennial. 6-30 inches high, hirsute, leaves ternate, basal and lower petioled, the upper sessile; leaflets obovate, obtuse, incisely-serrate, pubescent; flowers small, in a close leafy cyme; calyx large, lobes ovate; petals obovate, retuse, shorter than the calyx-lobes; stamens 15-20. Dry soil; June-September; common. (*P. montpellierensis* L.)

P. paradoxa Nutt. Stems decumbent to erect, subvillous. 1-3 feet high; leaves mostly petioled, pinnately 5-11-foliate; leaflets obovate or oval, obtuse; flowers in a loose leafy cyme; stamens about 20; achenes glabrous, strongly gibbous. Wet soil, shores; June-September; frequent; Cerro Gordo, Dickinsen, and Woodbury counties. (*P. supina* L. of Gray's Manual.)

P. nicolletii (Wats.) Sheldon. Similar to the preceding but leaves mostly 3-foliate; flowers falsely racemose; stamens 10-15. Reported from Iowa.

P. pentandra Engelm. Stem 1-4 feet high, erect, hirsute, branched above; basal and lower leaves petioled, 3-foliate, the lateral leaflets deeply parted, the upper ternate; leaflets oblanceolate or oblong, obtuse, incised-dentate; flowers terminal, more or less cymose; stamens 5-8, when 5 opposite the sepals. Reported from Scott, Story, Humboldt, Woodbury, and Fremont counties.

P. leucocarpa Rydberg. A decumbent or ascending annual, 6-30 inches high, pubescent or glabrate; leaves all 3-foliate; leaflets oblong, cuneate, thin, incisely-serrate; flowers terminal, loosely cymose; stamens about 10; achenes small, glabrous. Reported from Woodbury county. (*P. millegrana* Watson.)

P. rivalis Nutt. Stem slender, branched, villous; leaves pinnately 5-foliate or 3-foliate and the terminal leaflet 3-parted; cyme loose; calyx small; petals minute; stamens 10-20. Reported from Fayette and Woodbury counties.

† *Leaves more or less white tomentose; stamens 20-25.*

P. pennsylvanica L. Stems usually erect, 15-30 inches high; leaflets 5-9, grayish-tomentose beneath, glabrous above, oblong, obtuse, incisely-pinnatifid into linear segments; flowers in a dense cyme; stamens 20-25. Reported from Lyon and Jones counties.

*** *Perennial; flowers purple; receptacle hairy, becoming large and spongy; style lateral; achenes glabrous.*

P. palustris (L.) Scop. Base decumbent, woody, perennial; stem glabrous below, pubescent above; leaves pinnate, the lower long-petioled, 5-7 foliolate; leaflets oblong or oval, serrate; flowers few, showy, in an open cyme; calyx with narrow bractlets, purple within; petals shorter, purple; stamens many. Swampy places; June-August; infrequent; Emmet, Cerro Gordo, and Hancock counties. (*Comarum palustre* L.)

**** *Shrubby perennials; receptacle and achenes villous; style attached below the middle.*

P. fruticosa L. Erect, shrubby, $\frac{1}{2}$ -3 feet high, much branched, bark shreddy; leaflets 5-7, oblong, entire, silky, margins revolute; petals yellow, orbicular; stamens 15-20. Rocky bluffs; June-September; infrequent; Winneshiek and Allamakee counties.

P. tridentata Ait. Stems tufted, woody, 1-10 inches high; leaves petioled, 3-foliate; lower leaflets oblanceolate, cuneate toward the base, apex truncate, 3-toothed or sometimes 2-6-toothed, upper leaflets linear or oblong, often entire; petals white; stamens about 20. Rocky places; June-August; reported from Winneshiek county.

***** *Herbaceous perennials; flowers solitary, on slender axillary peduncles, yellow; styles slender, lateral achenes glabrous.*

P. canadensis L. Stems slender, prostrate or decumbent; leaves petioled, digitately 5-foliate; leaflets oblanceolate or oblong, obtuse at the apex, serrate; stamens about 20. Dry soil, woods and fields; April-August; common.

P. anserina L. Leaves petioled, pinnate; leaflets 7-25, oblong to obovate, obtuse, serrate, white and silky-pubescent beneath. Abundant along railroad embankment at Jewel Junction, Hamilton county. (Hitchcock).

AGRIMONIA L. Perennial herbs, with alternate interruptedly pinnate leaves, and small yellow flowers in spike-like racemes. Calyx-tube inversely conical, constricted at the throat, armed with hooked prickles on the upper portion, 5-cleft, hardened in fruit, and enclosing the 2 achenes. Petals 5. Stamens 12-15. Styles terminal.

A. hirsuta (Muhl.) Bicknell. Stem 2-4 feet high, erect, simple, hairy, from fibrous roots; leaflets 5-7, with minute ones intermixed, elliptic to broadly oblong, coarsely dentate, usually glabrous below; petals twice the length of the reflexed sepals. Woods; July-August; common. (*A. eupatoria* L. of Gray's Manual.)

A. mollis (T. & G.) Britton. Stem 1-4 feet high, villous below, pubescent or canescent above, paniculately branched; roots tuberous; leaflets 5-11, narrowly oblong to obovate, *velvety pubescent* beneath, crenate to dentate, interposed leaf-segments mostly in single pairs. Dry woods; July-September; frequent; Johnson, Van Buren, Ringgold, and Page counties.

A. parviflora Soland. Stem 2-5 feet high, virgately branched, densely *hirsute* with brownish hairs; roots not tuberous; leaflets crowded, 11-19, lanceolate or linear-lanceolate, serrate; flowers numerous, in long racemes; petals small. Prairies and woods; July-September; frequent; Muscatine, Lee, Decatur, Ringgold, and Page counties.

ROSA L. Erect or climbing shrubs, usually prickly, with alternate odd-pinnate leaves, adnate stipules, and solitary or corymbose showy flowers. Calyx-tube cup-shaped or urn-shaped, constricted at the throat, fleshy in fruit, usually 5-lobed. Petals usually 5, spreading. Stamens many, inserted with the petals into the edge of the hollow annular disk. Achenes several, enclosed in the fruiting calyx-tube. A difficult genus and perfect specimens are requisite for positive determination.

* *Sepals persistent.*

R. arkansana Porter. Stems 1-2 feet high, densely prickly, infrastipular spines none; stipules narrow; leaflets 7-11, oval or obovate, sharply serrate; outer sepals lobed; fruit globose, glabrous. Prairies; June-July; common. Often mistaken for the following species.

R. blanda Ait. Stems 2-4 feet high, entirely unarmed or with a few prickles; stipules dilated; leaflets 5-7, short-stalked, oval or obovate, obtuse, serrate; sepals entire, hispid. Specimens from Emmet, Winneshiek, and Johnson counties have been referred to this species but the determinations are doubtful. The species has been reported from several localities.

R. woodsii Lindl. Stems 4-30 inches high; armed with slender straight spines or naked above; infrastipular spines present; stipules rather broad, entire; leaflets 5-9, oval or obovate, sharply serrate, somewhat glaucous beneath; sepals lobed or entire; fruit globose or globose-ovoid, glabrous, sometimes glaucous. Thicket near a swamp; Fremont county.

** *Sepals deciduous.*

R. humilis Marsh. Stems 1-3 feet high, more or less prickly, infrastipular spines present; stipules narrow; leaflets 5 or 7, ovate or obovate, coarsely and sharply serrate; outer sepals more or less lobed; fruit globose or depressed-globose, glandular hispid. Woods; May-July; frequent; Muscatine, Johnson, and Henry counties.

R. rubiginosa L. *Sweetbrier. Eglantine.* Stems 3-5 feet high, armed with stout recurved spines; leaflets 5-7, ovate or oval, doubly serrate, glandular-pubescent and resinous beneath, aromatic. Introduced; June-July; infrequent; Muscatine, Henry, and Decatur counties.

POMACEAE L. APPLE FAMILY

Trees or shrubs, with alternate petioled leaves, small free deciduous stipules, and regular perfect flowers, solitary or in cymes or racemes. Calyx 5-lobed or 5-toothed, tube adnate to the ovary. Petals usually 5, clawed. Stamens few to many. Ovary usually 5-celled. Carpels 1-5, wholly or partially united, 1-2-ovuled. Styles 1-5. Fruit a pome.

* *Cells of the ovary as many as the styles.*

PYRUS. Pome large, fleshy; carpels papery, 2-5.

CRATAEGUS. Pome small; carpels bony, 1-5.

* *Cells of the ovary apparently twice as many as the styles.*

AMELANCHIER. With us the only genus.

PYRUS L. Small trees or shrubs, with toothed or lobed leaves, and fragrant flowers in simple terminal cymes. Calyx urn-shaped, 5-cleft. Petals 5, roundish. Stamens many. Styles 2-5. Fruit a pome, with the central portion papery, 2-5-celled, each cell 2-seeded.

P. ioensis (Wood) Bailey. *Western Crab Apple.* A small tree, 10-15 feet high, bushy, often spiny; leaves ovate, oval or oblong, dentate or crenate, or often with a few rounded lobes, obtuse, white-pubescent beneath, mostly glabrous above; flowers white to rose-color, appearing with the leaves; fruit globular, about an inch in diameter, green, sour. Thickets; May; common. Usually labeled *P. coronaria* L. (*P. coronaria* var. *ioensis* Wood. *Malus ioensis* (Wood) Britton.)

P. malus L. *Common Apple.* This species is becoming a frequent escape along roadsides and in waste places. Observed in Appanoose, Decatur, Ringgold, Union, Adams, Page, Montgomery, and Pottawattomie counties.

CRATAEGUS L. Thorny trees or shrubs, with alternate petioled serrate lobed or pinnatifid leaves, and usually white flowers in terminal corymbose clusters. Calyx urceolate or campanulate, limb 5-cleft. Petals 5. Stamens many. Ovaries 1-5, with corresponding number of styles. Pome drupe-like, containing 1-5 bony carpels.

* *Leaves obovate, spatulate or oblanceolate.*

C. crus-galli L. *Cockscomb Thorn.* Shrub or small tree, 8-25 feet high; branches grayish, horizontal; thorns long and slender; leaves cuneate-obovate, coriaceous, dull green, glabrous on both sides, serrate above the middle; corymbs many-flowered, pedicels and calyx glabrous; fruit globular. Thickets; May; common.

C. punctata Jacq. Similar to the preceding; leaves obovate, short-pointed or obtuse, cuneate toward the base and entire below, irregularly serrate, slender petioled, glabrous above, mostly pubescent beneath; corymbs many-flowered; calyx and pedicels mostly pubescent; fruit globose or oval. Thickets; May; frequent; Allamakee, Fayette, Webster, Story, Cerro Gordo, and Emmet counties.

* * *Leaves ovate or broadly oval or somewhat orbicular.*

† *Leaves pubescent, especially on the veins beneath.*

C. mollis (T. & G.) Scheele. A small tree or shrub, 10-25 feet high; leaves usually broadly ovate, base truncate, incised, sharply serrate, teeth gland-tipped, rough above, very pubescent beneath; twigs, petioles, pedicels, and calyx densely pubescent. Rich woods, thickets; April-May; common. (*C. coccinea* var. *mollis* T. & G.)

C. tomentosa L. Ranging from 10-25 feet high; spines stout; leaves ovate-oval or broadly oval, acute or acutish, sharply serrate, frequently incisely lobed, base tapering or cuneate, petioles marginated; twigs, shoots, and lower surface of the leaves, especially along the veins pubescent or villous-pubescent; flowers small, ill-scented. Lowlands woods, thickets; May-June; frequent.

† † *Leaves glabrous or nearly so; teeth mostly gland-tipped.*

C. rotundifolia (Ehrh.) Bock. A shrub or small tree similar to the preceding, but with slender spines, and mostly smaller leaves which are oval or obovate, slender-petioled, glabrous or nearly so, base tapering or cuneate, incised-serrate or somewhat lobed. Uplands; April-May; infrequent; Johnson county.

C. coccinea L. Spines stout; leaves ovate or orbicular, apex acute or acuminate, base *truncate* or *subcordate*, thin, sharply incised and serrate; flowers numerous. Woods, thickets; April-May; common; Johnson county. The species has been reported from many localities but is confused with *C. mollis* (T. & G.) Sheeble.

AMELANCHIER Medic. Small trees or shrubs, with simple alternate petioled leaves, and white racemose flowers. Calyx 5-cleft, the lobes reflexed, persistent. Petals 5, oblong-spatulate or oblong. Stamens short, many. Styles 5, united below. Fruit a berry-like pome, 5-celled, each cell with a false partition, thus apparently 10-celled, and each cell 2-seeded.

* Leaves usually serrate all around.

A. canadensis (L.) Medic. *June-berry*. *Service-berry*. A small tree, usually 10-25 feet high; leaves ovate or oval, acute or acuminate, base rounded or cordate, sharply or finely serrate, sparingly pubescent when young, soon glabrous; racemes spreading or drooping, pedicels slender, long; petals linear-oblong to linear-spatulate, 3-4 times the length of the calyx; pome globose, red or purple, on long slender pedicels. Wooded bluffs; April-May, fruit ripe in July; frequent; Winnesieck, Allamakee, Fayette, Delaware, Johnson, Story, and Decatur counties.

A. botryosum (L. f.) DC. Usually a small shrub, with leaves and racemes densely white-woolly when young, often glabrous when old; leaves oblong, oval to obovate, acute, base rounded or narrowed, sharply serrate; raceme dense, short; pedicels short; petals spatulate, 2-3 times the length of the calyx-lobes. Wooded bluffs; April-May; infrequent; Fayette and Johnson counties. (*A. canadensis* var. *oblongifolia* T. & G.)

* * Leaves dentate above the middle.

A. clinifolia Nutt. A shrub, 3-7 feet high, mostly glabrate, somewhat glaucous; leaves thickish, broadly elliptical to nearly orbicular, obtuse or sometimes truncate at the apex, base rounded or subcordate, coarsely dentate above; raceme short, dense; pedicels short; petals cuneate-oblong. Dry soil; April; infrequent; Winnebago county; reported from Winnesieck county.

SAXIFRAGACEAE *Dumort.* SAXIFRAGE FAMILY.

Herbs or shrubs, with alternate or opposite usually exstipulate leaves, and mostly regular flowers. Calyx of 4 or 5 distinct or slightly united sepals. Petals as many as the sepals and alternate with them or none. Stamens 4 or 5, inserted alternately with the petals, or twice the number of the petals. Fruit a capsule or a berry.

* Herbs; leaves usually alternate.

SAXIFRAGA. Flowers perfect; stamens 10; ovary 2-celled.

SULLIVANTIA. Flowers perfect; stamens 5; ovary 2-celled; seeds wing-margined.

MITELLA. Calyx adnate to the base of the 1-celled ovary; petals pinnatifid; stamens 10.

HEUCHERA. Calyx adnate to the base of the 1-celled ovary; petals small, entire; stamens 5; carpels 2.

CHRYSOSPLENIUM. Petals wanting; stamens 10; styles 2.

PARNASSIA. Flowers showy, terminal; fertile stamens 5, sterile stamens clustered at the base of the petals.

* Shrubs; leaves opposite.

HYDRANGEA. Flowers in compound cymes; stamens 8 or 10.

SAXIFRAGA L. Perennials, with simple leaves, in ours clustered at the root, and perfect flowers. Sepals 5, more or less connivent. Petals 5, entire, inserted on the calyx-tube, imbricated in the bud. Stamens 10; anthers 2-celled. Styles 2. Ovary 2-celled. Capsule 2-celled, 2-beaked.

S. pennsylvanica L. Scape 1-3 feet high, downy-pubescent; leaves oblong-lanceolate, entire or denticulate, petiole broad; flowers cymose-paniculate; calyx adnate to the base of the ovary, lobes recurved; petals greenish, linear-lanceolate, but little exceeding the calyx; capsule diverging by the beaks into nearly separate follicles. Moist meadows and woods; May-June; frequent; Winneshiek, Allamakee, Fayette, Scott, Linn, Johnson, and Cerro Gordo counties.

SULLIVANTIA T & G. Perennials, with lobed or cut-toothed petioled rounded leaves, and small white flowers in a loose cymose-panicle. Calyx campanulate, adherent to the base of the ovary, 5-cleft. Petals 5, oblanceolate, twice the length of the calyx. Stamens 5, included. Capsule 2-celled, 2-beaked, with many wing-margined seeds.

S. ohionis T. & G. Stem low, 4-10 inches high, weak, nearly leafless; leaves palmately veined. Limestone cliffs; May-August; infrequent; Jones, Delaware, Jackson, and Cedar counties. (*Sullivantia sullivantia* (T. & G.) Brit.)

MITELLA L. Perennials, with alternate radical leaves and opposite caulin leaves, and small flowers in a slender spike. Calyx 5-cleft, short, adnate to the base of the ovary. Petals 5, pinnatifid. Stamens 10, included. Styles 2, short. Capsule 1-celled, 2-beaked, opening by two equal valves.

M. diphylla L. *Bishop's cap* or *mitre-wort*. Stem hairy, 8-16 inches high; leaves cordate acute, dentate, sublobate; radical leaves long-petioled, caulin leaves 2; very short-petioled; flowers white. Rich woods; May-June; frequent; Winneshiek, Fayette, Scott, Muscatine, Henry, and Johnson counties.

HEUCHERA L. Perennials, with long-petioled radical leaves, and greenish or purplish flowers in small clusters, paniculate. Calyx campanulate, 5-cleft, segments obtuse, tube adnate to the base of the ovary. Petals 5, small, spatulate, entire, inserted with the 5 stamens on the throat of the calyx. Styles 2. Capsule 1-celled, 2-beaked, opening between the beaks.

H. hispida Pursh. Stem 2-4 feet high; stem, petioles, and veins hirsute with long spreading hairs; leaves rounded, cordate at the base, 5-9-lobed, toothed; flowers greenish, oblique; stamens exserted. Prairies; May-June; common.

CHRYSOSPLENIUM L. Stems low. Calyx 4-5-lobed, yellow inside, adnate to the ovary. Petals wanting. Stamens 8-10, short. Styles 2. Capsule obcordate, 1-celled, 2-valved, many-seeded.

C. alternifolium L. *Golden Saxifrage*. Found in a deep ravine among moss; Winneshiek county, the only locality in the state.

PARNASSIA L. Scape-like perennials with solitary terminal flowers. Calyx deeply 5-parted, imbricated in the bud, persistent. Petals 5, spreading, white, imbricated in the bud. Fertile stamens 5, alternate with the petals, sterile stamens in clusters at the base of the petals. Stigmas 4, sessile. Ovary 1-celled, with 4 parietal placentæ. Seeds winged.

P. caroliniana Mx. Scapes glabrous, 10-20 inches high, with one sessile leaf near the base; radical leaves petioled, round-oval; sterile stamens in each cluster 3, gland-tipped; petals ovate, obtuse, greenish veined, 3-4 times the length of the sepals. Wet meadows and river banks; June-August; infrequent; Emmet, Fayette, Muscatine, Johnson, and Story counties.

HYDRANGEA L. Shrubs, with opposite petioled exstipulate leaves, and corymbose often apetalous flowers. Calyx-tube hemispheric, adnate to the ovary, 8-10-ribbed, 4-5-lobed. Petals 4-5. Stamens 8-10, inserted on the disk. Styles 2, diverging. Ovary 2-4-celled. Capsule membranous, 2-celled, many-seeded, about 15-ribbed.

H. arborescens L. *Wild Hydrangea*. A shrub, 4-10 feet high, with ovate pointed serrate leaves, and mostly fertile flowers in cymes. Reported from Lee county.

GROSSULARIACEAE Dumort. GOOSEBERRY FAMILY.

Low shrubs, with alternate palmately-lobed single or clustered leaves, and solitary or racemose flowers. Calyx 5-lobed, adherent to the ovary, withering persistent. Petals 5, small. Stamens 5, alternate with the petals, inserted with the petals on the top of the calyx-tube. Styles 2, distinct or united. Ovary 1-celled, with 2-parietal placentæ. Fruit a berry. Represented by the genus *RIBES* L.

* *Peduncles axillary, solitary, 1-3-flowered.*

R. gracile Mx. *Common Wild Gooseberry*. Stems recurved, often with long and stout red thorns; leaves rounded; lobed and incised; flowers whitish; calyx-tube short and narrow; calyx-lobes oblong-linear, filaments slender, connivent or parallel, much exserted; berry smooth. Woods; May; common.

R. cynosbati L. *Prickly G.* Leaves similar to the preceding, pubescent; calyx campanulate, tube longer than the lobes, stamens and style not exserted, styles united; berry armed with long spines. Woods; May; frequent; Winneshiek, Clayton, Dubuque; Fayette, Delaware, Scott, Muscatine, Henry, Johnson, Story, Dallas, Webster, and Cerro Gordo counties.

R. oxyacanthoides L. Flowers greenish or purplish, peduncles short; stamens not exceeding the oblong calyx-lobes. Hillsides; April-May; reported as frequent from Delaware and Henry counties.

* * *Flowers in drooping racemes.*

R. floridum L'Her. *Wild Black Currant*. Stems without thorns or prickles; leaves heart-shaped, 3-5-lobed, toothed; flowers large, whitish; bracts longer than the pedicels; stamens and style short; berry smooth, black. Woods; May; frequent; Winneshiek, Allamakee, Clayton, Delaware, Scott, Muscatine, Fayette, Johnson, Emmett, Story, Winnebago, Floyd, Cerro Gordo, Lyon, Woodbury, and Taylor counties.

R. rubrum L. *Red Currant*. Fruit globose, red. This species is the common garden currant, occasionally an escape.

R. aureum Pursh. *Golden, Buffalo, or Missouri Currant*. Shrub 5-12 feet high, with 3-5-lobed, leaves, and showy golden-yellow flowers in short racemes. Frequent in cultivation, occasionally spontaneous; April-May.

CRASSULACEAE DC. ORPINE FAMILY.

Herbs with cymose flowers. Sepals and pistals of the same number. Petals as many as the sepals or wanting. Stamens twice as many as the sepals. Fruit capsular, dehiscent.

PENTHORUM. Plants not succulent; carpels united.

SEDUM. Plants very succulent; carpels distinct.

PENTHORUM L. Perennials, with leafy stems, and yellowish green apetalous flowers. Sepals and pistils 5. Stamens 10. Fruit of 5 one-celled carpels, united at the base, each horned above. Seeds small, many.

P. sedoides L. *Ditch Stonecrop*. Stem 1-3 feet high; leaves scattered, sessile, lanceolate, tapering both ways, serrate. Common in wet soil; July-September.

SEDUM L. Leaves thick, succulent, sepals, petals, and pistils 4-5. Stamens 8-10. Carpels distinct, many-seeded.

S. telephium L. *Orpine. Live-forever.* A glabrous somewhat glaucous

perennial with ovate to obovate, obtuse, coarsely dentate leaves, and purple flowers in a dense cyme. A rare garden escape observed in Muscatine and Johnson counties.

HAMAMELIDACEAE *Lindl.* WITCH HAZEL FAMILY.

Small trees, with alternate simple petioled pinnately-veined leaves, deciduous stipules, and axillary clustered or capitate flowers. Calyx superior, imbricated in the bud, deciduous. Petals inserted on the calyx, valvate in the bud, deciduous. Ovary 2-celled. Styles 2, distinct. Represented with us by the genus **HAMAMELIS** L.

H. virginiana L. *Witch-hazel.* Tree 10-20 feet high; leaves oval or obovate, wavy-toothed; flowers yellow; calyx 4-parted, with 3 scale-like leaves immediately below; petals 4, long-linear; stamens 8, 4 fertile and alternate with the petals, the remainder sterile; fruit a 2-celled woody capsule, opening at the top, cells 1-seeded; seeds pendulous. Wooded ravines; flowers appearing in October and the fruit the following July; infrequent; Clayton, Dubuque, and Delaware counties.

HALORAGIDACEAE *Kl. & Garcke.* WATER-MILLFOIL FAMILY.

Marsh or aquatic plants. Leaves alternate, opposite or whorled, entire or toothed; submerged leaves pinnately divided into narrow segments. Flowers solitary, fascicled or whorled, sessile. Calyx superior; tube coherent with the ovary. Petals small, inserted on the calyx, alternate with its segments. Calyx and corolla sometimes wanting. Stamens 1-8, inserted with the petals. Ovary inferior, with 2-4 1-ovuled cells.

MYRIOPHYLLUM. Leaves whorled; flowers monococious or polygamous, the parts in fours.

PROSERPINACA. Leaves alternate; flowers perfect, the parts in threes.

CALLITRICA. Leaves opposite; flowers monococious; sepals and petals wanting.

MYRIOPHYLLUM L. WATER MILLFOIL. Perennial aquatics. Leaves crowded or whorled, the submerged dissected into capillary divisions. Flowers monococious or polygamous in the axils of the upper leaves; the upper staminate. Stamens 4-8. Fruit nut-like, 4-lobed, 4-celled.

M. scabratum Mx. Stem slender; leaves in whorls of 4 or 5, lower pinnately parted, floral linear, toothed or serrate; stamens 4. Shallow lakes; July; frequent; Muscatine, Appanoose, Ringgold, and Fremont counties. (*M. pinnatum* (Walt.) B. S. P.)

M. heterophyllum Mx. Stem stout; leaves in 4's and 5's; floral leaves ovate or lanceolate, crowded, serrate, stamens 4. Lakes; July; Winnebago, Cerro Gordo, and O'Brien counties.

M. spicatum L. Leaves mostly pinnately-parted, capillary; floral leaves small, shorter than the flowers, ovate, entire or toothed; flowers in an interrupted spike; petals deciduous; stamens 8. Ponds; July; Muscatine, Cerro Gordo, Story, and Dickinson counties.

PROSERPINACA L. Perennial aquatics, with alternate lanceolate leaves, and perfect small sessile axillary flowers. Calyx 3-sided, adnate to the ovary, limb 3-parted. Petals wanting. Stamens 3-4. Stigmas 3, cylindrical. Fruit bony, 3-4-angled, 3-4-celled, 3-4-seeded.

P. palustris L. *Mermaid weed*, Glabrous, mostly simple; emersed leaves oblong or linear-lanceolate, sharply serrate; the immersed leaves pectinate or pectinate-pinnatifid, the segments linear, stiff, acute, often serrulate, flowers

solitary or several together; fruit sharply angled. Ponds; July; rather rare; Muscatine, Story, and Boone counties.

CALLITRICHE L. Leaves spatulate or linear, opposite. Flowers monoeious, 1-3 together, axillary, sessile. Sepals and petals wanting. Sterile flowers with one stamen; anther cordate, 4-celled, becoming 1-celled. Ovary 4 celled. Styles 2, distinct. Fruit nut-like, 4-lobed, 4-celled, membranous, indehiscent.

C. verna L. Perennial; floating leaves tufted, obovate, 3-nerved, narrowed into a petiole; submerged leaves linear; flowers usually between a pair of bracts; fruit ovate, styles shorter than the fruit. In a slough near Cedar river, Muscatine county; June-September. (*C. palustris* L.)

C. heterophylla Pursh. Similar to the preceding species; floating leaves broadly spatulate, often retuse, narrowed into a petiole; fruit obovate; styles longer than the fruit. Wet slough; July; infrequent; Decatur county.

MELASTOMACEAE R. Br. MEADOW-BEAUTY FAMILY.

Herbs with opposite parallel-veined leaves and perfect regular cymose flowers. Petals inserted on the calyx-throat, alternate with the calyx-lobes, stamens inserted with the petals, double their number; anthers opening by pores at the apex. Represented with us by the genus **REXIA** L.

R. virginica L. *Meadow-Beauty.* Stem 1-2 feet high, square, angles somewhat winged, rootstock tuberiferous: leaves with 3-5 nerves, sessile, acute, oval-lanceolate, nerves and margin more or less bristly; flowers peduncled, bright, purple; calyx persistent 4-cleft, lower portion of the tube coherent with the ovary, the upper free; petals 4; stamens 8; anthers long-linear, 1-celled, with a short spur near the filament; fruit a capsule, 4-celled, with 4 placentæ from the central axis, many-seeded. In swampy places along Cedar river; July; Muscatine county.

LYTHRACEAE Lindl. LOOSESTRIFE FAMILY.

Herbs, with mostly opposite entire exstipulate leaves and axillary or whorled flowers. Calyx free from the ovary but enclosing it, persistent 4-7-toothed. Petals inserted on the top of the calyx-throat, equal in number to the calyx-teeth, deciduous. Stamens 4-14, inserted on the calyx-tube. Style 1; stigma capitate. Capsule 2-4-celled, with axial placentæ, many-seeded.

* Flowers regular.

LYTHRUM. Flowers rarely solitary; calyx tubular; petals usually 6.

AMMANNIA. Flowers solitary; calyx globular; petals and stamens usually 4.

ROTAIA. Flowers solitary; sinuses of the calyx appendaged; petals and stamens 4.

DIDIPLIS. Flowers solitary; petals none; stamens 4.

* * Flowers irregular.

CUPhea. Calyx more or less spurred; petals 6; stamens 11 or 12.

LYTHRUM L. Leaves opposite or scattered, sessile. Flowers purple, solitary, axillary. Calyx tubular, striated, 5-toothed, with appendages in the sinuses. Petals 5-7. Stamens 5-14. Capsule oblong, 2-celled.

L. alatum Pursh. *Wing-angled Loosestrife.* Perennial, smooth; stem 1-3 feet high, with many long slender branches; leaves oblong-ovate to linear-lanceolate, acute, base rounded or cordate, the upper mostly alternate; petals deep purple; stamens of the short styled flowers exserted. Rich soil; July-August; common.

AMMANNIA L. Low smooth herbs, with opposite narrow leaves, and sub-

sessile cymose axillary flowers. Calyx globular, 4-angled, 4-toothed; sinuses with horn-like appendages. Petals 4, purplish, deciduous. Stamens 4-8. Capsule globular 2-4-celled.

A. coccinea Rottb. Stem 4-8 inches high, branched from below; leaves linear-lanceolate; stamens more or less exserted; style slender, elongated. Swampy places, shores; July-September; infrequent; Muscatine, Louisa, Johnson, Decatur, Story, and Lyon counties.

ROTALA L. Low herbs. Calyx semiglobose or campanulate; sinuses with tooth-like appendages. Petals and stamens 4. Capsule globular, 4-celled.

R. ramosior (L.) Koehne. Stem 5-6 inches high, smooth, simple; leaves linear-ob lanceolate, opposite, tapering to a petiole; flowers solitary, axillary, sessile; appendages shorter or as long as the calyx-teeth. Low wet places; July-September; infrequent; Muscatine, Henry, Benton, and Lyon counties.

DIDIPLIS Raf. Aquatic or marsh plants, with opposite leaves, 4-angled stems, and mostly solitary axillary flowers. Calyx 4-lobed, appendages none. Petals wanting. Stamens usually 4, inserted on the calyx-tube. Capsule globose, 2-celled.

D. linearis Raf. A low glabrous much branched plant, 2-6 inches long; leaves long-linear or lanceolate, mostly sessile; flowers small, greenish; calyx-lobes broad, triangular; style short; capsule small. Mud flats, shallow water; June-August; infrequent; Decatur and Ringgold counties. (*D. diandra* (Nutt.) Wood.)

CUPHEA P. Br. Herbs, with opposite or verticillate leaves, and axillary irregular unsymmetrical flowers. Calyx tubular, gibbous or spurred at the base, apex 6-toothed, with 6 appendages, mouth oblique. Petals 6, unequal. Stamens 11 or 12, inserted on the throat of the calyx, unequal. Capsule oblong, included, 1-celled, dehiscent.

C. viscosissima Jacq. An erect viscid-pubescent annual, 6-20 inches high, branched; leaves ovate-lanceolate, slender petioled, apex blunish, base rounded; flowers purple, axillary, short-peduncled; petals ovate, clawed. Dry soil; July-September; reported as belonging to the flora of Iowa by Arthur. (*Parsonia petiolata* (L.) Rusby.)

ONAGRACEAE *Dumort.* EVENING-PRIMROSE FAMILY.

Herbs, with alternate or opposite leaves, and perfect symmetrical flowers. Calyx herbaceous or colored, of 4 lobes, rarely less, valvate in the bud, tube cohering with the ovary. Stamens as many or twice as many as the petals and inserted with them on the top of the calyx-throat; anthers 2-celled, introrse; pollen grains often cohering by threads. Ovary inferior, 4-celled. Fruit a 2-4-celled many-seeded capsule.

* *Parts of the flower in fours.*

† *Calyx-tube not prolonged beyond the summit of the ovary; fruit dehiscent.*

LUDWIGIA. Leaves opposite or alternate, stamens 4; capsule short.

†† *Calyx-tube prolonged beyond the summit of the ovary; fruit dehiscent.*

EPILOBIUM. Leaves often opposite; seeds silky tufted.

OENOTHERA. Leaves alternate; seeds naked.

††† *Fruit indehiscent.*

GAURA. Filaments appendaged at the base; fruit indehiscent.

** *Parts of the flower in twos.*

CIRCAEA. Sepals, petals, and stamens 2; fruit bristly.

LUDWIGIA L. Perennial herbs, with opposite or alternate leaves, and solitary axillary flowers. Calyx-lobes, petals, and stamens 4, or petals wanting. Capsule short, many-seeded.

L. alternifolia L. *Seed-box*. Stem 2-3 feet high, branched, smoothish slightly wing-angled; leaves lanceolate to linear-lanceolate, alternate, sessile; flowers short peduncled; calyx-lobes ovate, acute, reddish; petals yellow; capsule cubical, wing-angled. Damp soil; June-August; rare; Johnson, and Decatur counties.

L. polycarpa Short & Peter. Stem 2-4 feet high, glabrous; leaves narrowly lanceolate, alternate, sessile, tapering both ways, those of the runners oblong spatulate; flowers small, sessile; capsule 4-sided, longer than the calyx-lobes, with 2-linear awl-shaped bractlets from the base. Borders of ponds and in shallow water; July-September; frequent; Fayette, Scott, Muscatine, Johnson, Story, Appanoose, Decatur, Ringgold, and Taylor counties.

L. palustris (L.) Ell. *Marsh or Water Purslane*. Stem smooth, creeping or floating; leaves ovate or oval, petioled, opposite; calyx-lobes short; petals small or wanting, reddish in terrestrial forms; capsule oblong, 4-sided, sessile. Wet places; July-September; infrequent; Fayette, Muscatine, Johnson, Benton, and Emmet counties. (*Isnardia palustris* L.)

EPILOBIUM L. Mostly perennials. Leaves nearly sessile, opposite or scattered. Flowers violet, purple, or white. Calyx-tube scarcely prolonged beyond the ovary; limb 4-5-lobed, deciduous. Petals 4. Stamens 8, with short anthers. Capsule linear, many-seeded. Seeds with a tuft of long hairs at the end, the coma.

E. angustifolium L. *Great Willow-herb. Fire-weed*. Stem simple, 4-6 feet high, glabrous or finely pubescent; leaves scattered, mostly entire, narrowly lanceolate, tapering both ways; flowers large, purple, in a long raceme; calyx-limb deeply parted; petals entire; lobes of the stigma long. Rich woods; June-September; frequent; Dubuque, Scott, Johnson, Winnebago, and Shelby counties. (*Chamaenerion angustifolium* (L.) Scop.)

E. coloratum Muhl. Stem 1-3 feet high, much branched, 4-angled, hoary pubescent; leaves lanceolate, contracted to slender petioles or sessile, acuminate, sharply serrulate or denticulate, lower opposite; flowers small, pale, somewhat nodding, short-peduncled; coma reddish-brown. Low grounds; July-September; common.

E. adenocaulon Haussk. This species resembles the preceding; leaves lanceolate or ovate-lanceolate, somewhat serrulate or denticulate; inflorescence and capsules glandular-pubescent; coma white. Wet places; July-September; frequent; Johnson, Story, Hamilton, Floyd, Hancock, Dickinson, and Emmet counties.

E. lineare Muhl. Stems somewhat branched, minutely hoary-pubescent; leaves numerous, linear or linear-lanceolate, short-petioled; flowers many, small, pale; capsules hoary; coma dingy. Wet places; July-September; infrequent; Fayette, Scott, Story, Hamilton, and Emmet counties.

OENOTHERA L. *EVENING PRIMROSE*. Leaves alternate. Calyx-tube prolonged beyond the ovary, deciduous, limb of 4 reflexed lobes. Petals 4, yellow in our species. Stamens 8; anthers linear, versatile.

OE. biennis L. Stem 1-5 feet high, sometimes branched, pubescent or hairy; leaves lanceolate or ovate, tapering both ways, acuminate, remotely toothed, the lowest petioled; flowers in a leafy spike; calyx-tube long; cap-

sules oblong, pubescent or hirsute, sessile, seeds prismatic-angled. Fields and waste places; July-September; common. (*Onagra biennis* (L.) Scop.)

OE. rhombipetala Nutt. Stem 1-4 feet high; simple, appressed pubescent; leaves narrowly lanceolate to linear, entire or denticulate, the lowest tapering to a petiole; flowers in a leafy or bracted spike; calyx silky canescent; petals rhombic-ovate; capsules linear; seeds obovoid, not angled. Sandy soil, prairies; July-September; Muscatine county, reported from Fayette, Story, and other counties, often confused with the preceding.

OE. fruticosa L. *Sundrops*. Biennial or perennial; stem 1-3 feet high, branched, villous to nearly glabrous; leaves oblong-lanceolate, entire or denticulate; flowers in a loose corymb; capsule short-pedicelled, ribbed and winged. Low grounds; June-August; infrequent; Muscatine, Johnson, and Henry counties. (*Kneiffia fruticosa* (L.) Raimann.)

OE. serrulata Nutt. Stem 6-16 inches high, perennial, woody below, canescent or glabrous; leaves mostly linear or lanceolate, irregularly and sharply denticulate; flowers axillary; calyx-tube funnelform, nerved; petals obovate, crenulate. Dry soil, pastures and waysides; June-July; frequent; Winneshiek, Allamakee, Fayette, Story, Shelby, Fremont, Cerro Gordo, Hancock, Dickinson, Ida, Emmet, Sioux, Woodbury, and Lyon counties. (*Meriolix serrulata* (Nutt.) Walp.)

GAURA L. Leaves alternate, sessile. Flowers white or rose-color, in spikes or racemes. Calyx-tube much prolonged beyond the ovary, deciduous; calyx-lobes 4, reflexed. Petals 4, unequal, clawed. Stamens usually 8. Stigma 4-lobed. Fruit nut-like, indehiscent, 1-celled, 1-4-seeded.

G. biennis L. Stem 3-6 feet high, much branched, villous or downy-pubescent; leaves oblong-lanceolate or lanceolate, remotely denticulate; flowers sessile, white, turning pink, in numerous slender spikes; fruit sessile, 4-ribbed, oval or oblong, villous pubescent. Fields and waste places; July-September; common.

G. coccinea Pursh. Stem 6-20 inches high, erect or ascending, much branched, canescent, pubescent or glabrate; leaves oblong-lanceolate to linear-oblong, entire, repand or denticulate; flowers sessile, red, turning scarlet; fruit sessile, terete below, 4-sided above, canescent. Dry soil, prairies; May-August; frequent; Woodbury, Harrison, Monona, and Fremont counties.

G. parviflora Dougl. Stem 2-6 feet high, villous-pubescent; leaves ovate-lanceolate, acuminate, repand-denticulate, base narrowed, softly pubescent; flowers many, pink, sessile, in an elongated spike; fruit sessile, 4-nerved, obtusely 4-angled, glabrous or nearly so. Meadows and fields; May-August; frequent; Woodbury, Harrison, Pottawattomie, and Fremont counties.

CIRCAEA L. Perennials, with opposite petioled thin leaves, and small whitish racemose flowers. Calyx-tube slightly prolonged, the end filled by a cup-shaped disk, deciduous. Petals 2, obovate. Stamens 2. Fruit small, bur-like, indehiscent, clothed with white hooked hairs.

C. lutetiana L. Stem simple, 1-2 feet high; leaves ovate, long-petioled, base rounded, acuminate, entire or slightly toothed; bracts none; fruit 2-celled, slender pedicelled, bristly. Rich woods; June-August; common.

C. alpina L. Stem weak, 3-9 inches high; leaves cordate, thin, shining, coarsely toothed; bracts minute; fruit 1-celled, obovate-oblong, soft hairy. Rich woods; June-August; infrequent; Winneshiek, Clayton, and Muscatine counties.

LOASACEAE *Reichenb* LOASA FAMILY.

Erect herbs, with stinging or viscid pubescence, alternate or opposite exstipulate leaves, and regular perfect solitary or cymose flowers. Calyx-tube adnate to the ovary, limb 4-5-lobed, persistent. Petals 4-10, inserted on the throat of the calyx. Stamens many, inserted with the petals. Ovary 1-celled, with 1-3 parietal placentæ. Capsule 1-celled. Represented in our flora by the genus *MENTZELIA* L.

M. ornata T. & G. Stem stout 1-2 feet high, roughish-pubescent; leaves sessile, or lower petioled, oval to lanceolate or oblong, sinuate-pinnatifid, flowers usually solitary, terminal, yellowish white, opening in the evening, petals 10, twice as long as the calyx-lobes; capsules oblong. Sandy and rocky bluffs along the Big Sioux river, Cedar Bluffs; June-September; common; Woodbury county. (Pammel) (*M. decapetala* (Pursh.) Urban & Gilg.)

CUCURBITACEAE *B. Juss.* GOUD FAMILY.

Climbing or trailing succulent herbs with tendrils. Leaves alternate, petioled, palmately lobed, palmately veined. Flowers monoecious or dioecious, axillary, sometimes gamopetalous. Calyx usually campanulate, 5-toothed or 5-lobed, imbricated in the bud. Corolla monopetalous, rotate or campanulate. Stamens 5 or 3, of which one is usually 1-celled. Stigmas 2 or 3. Ovary inferior, 1-celled, with 3 parietal placentæ. Represented in cultivation by the gourd, pumpkin, melon, squash, cucumber, etc.

ECHINOCYSTIS. Fruit echinate, 4-seeded.

SICYOS. Fruit prickly, 1-seeded.

ECHINOCYSTIS T. & G. Annuals with 3 forked tendrils, climbing high. Flowers monoecious, small, greenish white; the sterile in a long compound raceme, the fertile solitary or in small clusters; petals 6; anthers 3, more or less united; stigmas 2; fruit fleshy, inflated, becoming dry, bursting above, clothed with weak prickles, 4-seeded.

E. lobata T & G. *Wild Cucumber*. Leaves broad, thin, sharply and deeply 5-lobed; fruit oval, spines nearly half an inch long; seeds black. Low grounds along waterways; July-September; common. (*Micromelis lobata* (Mx.) Greene.)

SICYOS L. Annuals with 3 forked tendrils, climbing high. Flowers monoecious, from the same axil, small, whitish. Petals 5, united below. Anthers cohering in a mass. Style slender, with 3 stigmas. Ovary 1-celled, with a single suspended ovule. Fruit ovate, dry, indehiscent, filled by the seed, spiny.

S. angulatus L. *One-seeded Bur-Cucumber*. Clammy hairy; leaves roundish cordate, with 5 pointed angles or lobes. Rich soil, along rivers and in waste places; July-September; frequent; Scott, Muscatine, Louisa, Des Moines, and Dallas counties.

CACTACEAE *Lindl.* CACTUS FAMILY.

Ours green and fleshy plants, with flattened and joined stems armed with spines and prickles, and solitary sessile flowers. Sepals, petals, and stamens numerous, their bases cohering and adnate to the inferior 1-celled many-ovuled ovary. Fruit a 1-celled berry. Represented in our flora by the genus *OPUNTIA* Mill.

O. rafinesquii Engelm. *Prickly Pear.* Prostrate, green; joints obovate to suborbicular or oval; leaves spreading, subulate; spines axillary, 1-5 together; prickles tufted, axillary, reddish brown; flowers large, yellow, with a reddish center; stamens shorter than the petals; stigmas 4-10; fruit fleshy, edible. Sandy soil; June-July; infrequent; Muscatine and Lyon counties. (*O. humifusa* Raf.)

O. fragilis (Nutt.) Haw. Prostrate or decumbent; joints ovate, nearly terete or flattish; leaves small, reddish; flowers yellow, smaller than those of the preceding; fruit dry at maturity. Dry soil; July-August; common; Lyon county.

AIZOACEAE A. Br. CARPET-WEED FAMILY.

Mostly prostrate and branching herbs, with opposite or verticillate leaves, and small regular perfect flowers, either solitary, cymose or glomerate. Calyx of 5 sepals, free from the ovary. Petals wanting. Represented in our flora by the genus *MOLLUGO* L.

M. verticillata L. *Carpet-weed.* Prostrate, much branched, annual, forming patches; leaves spatulate, whorled at the joints; pedicels slender, 1-flowered, clustered with the leaves; stamens mostly 3; stigmas 3; capsule 3-celled, 3-valved; seeds reniform. Sandy shores, waste places; July-September; common. This species is included by different botanists under FICOIDEAE or CARYOPHYLLACEAE.

UMBELLIFERAE B. Juss. CARROT FAMILY.

Herbs, with usually hollow stems, alternate compound or simple leaves, sheathing petioles, and small flowers in compound umbels, rarely in heads. Calyx adherent to the ovary, limb obsolete or 5-toothed. Petals and stamens 5, inserted on a fleshy disk which covers the ovary. Styles 2, distinct or united at their thickened bases. Ovary 2-celled, 2-ovuled. Fruit dry, consisting of 2 coherent carpels. A well defined but difficult order.

* Flowers white.

† Fruit flattened dorsally.

DAUCUS. Leaves pinnately decomound; calyx 5-toothed; fruit prickly along the ribs.

CONIOSELINUM. Leaves 2-3-pinnately decomound; fruit winged on the lateral lobes.

TIEDEMANNIA. Leaves simply pinnate.

HERACLEUM. Leaves large, ternately compound; flowers large.

† † Fruit flattened laterally.

SIUM. Leaves once pinnate; ribs prominent, equal, corky.

CARUM. Leaves decomound; fruit ovoid or oval; ribs filiform, inconspicuous.

CICUTA. Leaves pinnately compound, the veins running to the notches; ribs flattish, corky.

CONIUM. Stems spotted; leaves tripinnately dissected; ribs wavy.

† † † Fruit linear-oblong, slightly flattened laterally.

CRYPTOTAENIA. Leaves 3-foliate; fruit glabrous; ribs obtuse, equal.

BERULA. Aquatics; leaves simply pinnate; fruit globrous, nearly galbose; ribs inconspicuous.

CHAEROPHYLLUM. Leaves ternately decomound; fruit glabrous.

OSMORRHIZA. Leaves biternately divided; fruit bristly.

† † † Fruit ovate or obovate.

ERYNGIUM. Leaves parallel-veined, coriaceous, bristly-toothed; flowers in dense bracted globose heads.

* * Flowers yellow.

† Fruit globular, armed with hooked prickles.

SANICULA. Leaves palmately divided; flowers greenish yellow.

† † *Fruit flattened dorsally; slightly in Thaspium.*

PASTINACA. Leaves pinnately compound; dorsal ribs filiform, the lateral extending into wings.

POLYTAENIA. Leaves 2-pinnate; fruit with the lateral ribs thick corky, dorsal ribs obscure.

THASPİUM. Leaves 2-3-ternate; fruit oblong, with 5-7 wings, slightly flattened.

† † † *Fruit flattened laterally.*

FOENICULUM. Leaves dissected into filiform segments; ribs prominent.

PIMPINELLA. Leaves ternately compound; ribs slender.

ZIZIA. Leaves 2-3-ternate; fruit oblong, with filiform ribs; stylopodium wanting.

DAUCUS L. Biennials, with bristly stems, and pinnately decomound leaves. Involucre of foliaceous pinnately parted bracts. Involucels of many entire or toothed bracts. Flowers white, umbels compound, concave. Calyx teeth obsolete. Petals 5, the 2 outer often larger and deeply 2-cleft. Fruit oblong, dorsally, flattened, with 5 bristly primary ribs and 4 winged secondary ones. Stylopodium depressed.

D. carota L. The common cultivated carrot, frequently found wild in cultivated fields and waste places; July-September; Dubuque, Fayette, Story, Appanoose, and Decatur counties.

CONIOSELINEUM Hoffm. An erect glabrous perennial, with pinnately decomound leaves, involucre none or of few bracts, involucels of narrow linear bracts, and compound umbels of white flowers. Calyx-teeth none. Fruit oval or oblong, flattened, glabrous; dorsal ribs large, lateral broadly winged; oil-tubes usually 2 or 3 in the intervals. Stylopodium slightly conical.

C. canadense T. & G. Stem striate, 2-5 feet high; leaves decomound into linear oblong segments. Reported from Scott and Story counties.

TIEDEMANNIA DC. Glabrous perennials. Involucre and involucels present. Flowers white. Calyx 5-toothed. Fruit elliptic-ovate, dorsally compressed, glabrous; ribs equidistant, obtuse, the lateral ones broadly winged; oil-tubes solitary in the intervals and 2-6 on the inner face. Stylopodium short, thick, conical.

T. rigida (L.) Coul. & Rose. Whole plant smooth; stem 2-6 feet high, terete, striate, hollow, simple or sparingly branched; leaves all simply pseudo-pinnate; common petiole channeled, somewhat margined; leaflets lanceolate to linear, often slightly falcate, sessile, entire or remotely toothed toward the apex; umbels terminal and lateral. Sloughs and uplands; August; common; Johnson, Benton, Jasper, Story, Decatur, and Ringgold counties. (*Oxypolis rigidus* (L.) Britton.)

HERACLEUM L. Perennials, with ternately compound leaves, and white flowers in large umbels. Involucre of few bracts, deciduous. Involucels of small bracts. Calyx-teeth small or obsolete. Petals obcordate, the 2 outer often larger and 2-cleft. Fruit obovate, flattened, somewhat pubescent; dorsal ribs 3, obtuse, the lateral broadly winged. Stylopodium thick, conic.

H. lanatum Mx. *Cow-Parsnip.* Pubescent or woolly, 4-8 feet high; petioles much dilated; leaflets 3, petiolulate, round cordate, about 3-lobed; irregularly cut-toothed. Moist woods; June-July; frequent and generally distributed; Winneshiek, Allamakee, Fayette, Story, Winnebago, Webster, Calhoun, Cerro Gordo, Decatur, Union, Pottawattomie, Shelby, Woodbury, and Emmet counties.

SIUM L. Smooth perennials, with simply pinnate leaves, the lower often pinnatisected, and compound umbels of white flowers. Involucre and involucels of numerous narrow bracts. Calyx-teeth minute. Fruit glabrous, ovate

to oblong; ribs prominent, corky, nearly equal, oil-tubes 1-3 in the intervals. Stylopodium depressed.

S. cicutaeifolium Gmel. Stem 2-6 feet high, striate; leaflets 3-8 pairs, linear to lanceolate, sharply serrate, the submerged leaves finely dissected; rays numerous. Sloughs and swamps; July-September; frequent.

CARUM L. Ours a glabrous biennial or perennial, with pinnatisected leaves, divisions filiform, and small white flowers in terminal compound umbels. Calyx-teeth minute. Petals inflexed at the apex. Fruit ovate or oblong, glabrous, slightly compressed. Stylopodium conical.

C. carui L. *Caraway*. Stem erect, 1-2 feet high, branching; lower leaves long-petioled, the upper sessile or nearly so, bases of the petioles dilated. Introduced, waste places; May-July; Emmet county, reported from Fayette county.

CICUTA L. Smooth poisonous perennials. Leaves pinnately compound; leaflets serrate. Involucre usually wanting. Involucels of many slender bractlets. Flowers white. Calyx-teeth 5, broad. Fruit subglobose, glabrous, with 5 equal flattish corky ribs; oil-tubes solitary in the intervals. Stylopodium depressed.

C. maculata L. *Water Hemlock*. Stem 2-6 feet high, spotted or streaked; leaves bipinnate or tripinnate; leaflets lanceolate, mucronately serrate; veins running to the notches; fruit nearly terete. Sloughs and marshes; June-August; common.

C. bulbifera L. Stem 1-3 feet high; leaves 2-3 pinnate; leaflets linear, remotely toothed; upper axils bearing clustered bulbils. Swamps; July-September; infrequent; Muscatine, Linn, and Emmet counties.

CONIUM L. Biennials, with tripinnately dissected leaves, and white flowers. Involucre and involucels of narrow bracts. Calyx-teeth obsolete, fruit ovate, compressed; ribs equal, prominent, wavy when immature; oil-tubes wanting. Stylopodium depressed.

C. maculatum L. *Poison Hemlock*. Stem 2-6 feet high, spotted, glabrous, striate, sometimes glaucous; roots fusiform, fleshy; petioles very much dilated. Waste places; June-July; Winneshiek and Scott counties.

CRYPTOTAENIA DC. Glabrous perennials, with 3-foliate leaves, and white flowers. Involucre and involucels none. Calyx-teeth obsolete. Fruit glabrous, linear-oblong, with 5 obtuse equal ribs; oil-tubes solitary, beneath each rib and in the intervals. Stylopodium slender-conical.

C. canadensis DC. Stem smooth, 1-3 feet high; leaflets large, pointed, ovate, doubly serrate, often lobed; umbels irregular, unequally few-rayed; pedicels unequal; fruit often curved. Moist woods; June-September; common. (*Deringa canadensis* (L.) Kuntze.)

BERULA Hoffm. A glabrous aquatic or marsh perennial, with simple pinnate leaves, leaflets serrate and variously cut, involucre and involucels of narrow bracts, and terminal umbels of white flowers. Calyx-teeth minute. Fruit glabrous; ribs slender; pericarp thick, corky; oil-tubes numerous. Stylopodium conic; styles short.

B. angustifolia (L) Mert. & Koch. Stem 6-30 inches high; leaflets 7-19, ovate to linear-oblong, serrate, lacinate, or lobed. Reported from Sioux county. (*B. erecta* (Huds.) Coville.)

CHAEROPHYLLUM L. Annuals, with ternately decompound leaves, pinnatifid leaflets, and white flowers. Involucre usually none. Involucels of many bractlets. Fruit narrowly oblong to linear, notched at the base, with

5 equal ribs; oil tubes solitary in the intervals. Stylopodium conical.

C. procumbens (L.) Crantz. Stems weak, spreading, smoothish or somewhat hairy, 4-16 inches high; umbels few-rayed; leaflets trifid or pinnatifid; fruit acute. Low woods; April-May; infrequent; Johnson, Henry, Story, and Decatur counties.

OSMORRHIZA Raf. Glabrous or hirsute perennials, with large aromatic roots, and biennially divided leaves. Involure and involucels few-leaved. Flowers white. Calyx-teeth obsolete. Fruit long, linear, bristly, attenuate at the base. Stylopodium small, conic.

O. longistylis DC. Glabrous or somewhat pubescent; stem 1-2 feet high; style nearly as long as the ovary. Rich woods; May-June; common. (*Washingtonia longistylis* (Torr.) Britton.)

O. brevistylis DC. Villous; stylopodium and style about as long as the width of the ovary. With the preceding. (*W. claytoni* (Mx.) Britton.)

ERYNGIUM L. Perennials, with coriaceous leaves, and bracted sessile flowers in dense heads. Calyx-lobes prominent, rigid, persistent. Petals inflexed. Fruit ovate or obovate, scaly; ribs obsolete; oil-tubes usually 5. Stylopodium wanting; styles filiform.

E. yuccaeifolium Mx. *Button Snakeroot*. Stem 2-4 feet high, glabrous, striate; leaves often 1-2 feet long, rigid, grass-like, parallel-veined, tapering to a point, remotely bristly; heads ovate-globose; flowers white. Prairies; July-August; common. (*E. aquaticum* L.)

SANICULA L. Smooth biennials or perennials, with few palmately divided leaves, and greenish yellow flowers. Umbels irregular, few-rayed. Involure and involucels few-leaved. Calyx-teeth prominent and persistent. Fruit globular, ribless, with 5 oil-tubes, densely clothed with hooked bristles.

S. marylandica L. Stem 1-3 feet high, but little branched; leaves 3-7-parted, root-leaves long-petioled; segments irregularly serrate or dentate, often incised; staminate flowers many, long-pedicelled; calyx-segments lanceolate, cuspidate; petals and anthers greenish white; pistillate flowers sessile; styles slender, recurved, longer than the bristles. Low woods; May-July; common.

S. gregaria Bicknell. Stems usually clustered, weak, erect, 1-3 feet high; leaves 5-divided; segments doubly serrate, teeth bristle-tipped, incised; calyx lobes ovate, obtuse; petals and anthers yellow: styles longer than the bristles. This species probably belongs to our flora.

S. canadensis L. Biennial, stem 1-4 feet high, branched; leaves 3-5 divided; segments cuneate-obovate to oblong, serrate and incised; staminate flowers never in separate heads; styles shorter than the bristles. Low woods; May-August; common.

PASTINACA L. Biennial, with pinnately compound leaves, involure and involucels mostly wanting, and yellow flowers. Calyx-teeth obsolete. Fruit flat, oval, the dorsal ribs filiform, the lateral broad and nerved. Stylopodium depressed.

P. sativa L. Stem 3-4 feet high, grooved, glabrous; root fusiform; leaves downy beneath; leaflets ovate to oblong, toothed, terminal 3-lobed, all more or less lobed or incised. Fields and waste places; July-September; frequent.

POLYTAENIA DC. Perennial, glabrous herb, with pinnately decompound leaves, upper opposite, lower alternate and long-petioled, involure wanting, involucels of narrow bractlets, and bright yellow flowers in compound umbels. Calyx 5-toothed. Fruit flattened, obovate to oval, glabrous, dorsal ribs small, obscure, lateral thick and corky. Stylopodium wanting.

P. nuttallii DC. Stem 2-4 feet high; pedicels and involucels pubescent; leaf-segments narrow, entire or lobed. Prairies and upland woods; May-July; rather rare; Scott, Muscatine, Johnson, Story, Appanoose, Decatur, Ringgold, and Montgomery counties.

THASPIUM Nutt. Perennials, with ternately divided leaves, and yellow flowers. Involucre wanting. Involucels 3-leaved. Calyx 5-toothed. Stylopodium wanting; styles slender, exserted. Fruit oblong, ovoid, with prominent wings; oil-tubes solitary in the intervals, 2 on the inner face of the carpels.

T. barbinode Nutt. Stem 2-3 feet high, somewhat angular, striate, loosely branched, somewhat pubescent on the joints or in the umbels; leaves 1-3-ternate, mostly biennial; leaflets ovate, with cuneate base, coarsely serrate, often cleft or parted; flowers light yellow; fruit broadly oblong, 5-7 winged. Rich woods; May-June; probably common.

FOENICULUM Adans. Biennials or perennials, with striate stems, leaves biennially dissected into numerous filiform segments, and yellow flowers. Calyx-teeth obsolete. Involucre and involucels wanting. Fruit elliptic-oblong, subterete; ribs 5, prominent; oil-tubes solitary. Stylopodium large, conic.

F. officinale All. Whole plant aromatic; stem 4-6 feet high, purplish green, somewhat glaucous. Waste places; July-September; rarely escaped from cultivation; Johnson and Story counties. (*F. foeniculum* (L.) Karst.)

PIMPINELLA L. Glabrous perennial, with ternately compound leaves, involucre and involucels scanty or wanting, and yellow flowers. Calyx-teeth obsolete. Fruit ovate to oblong, laterally compressed; ribs slender, equal; oil-tubes numerous, 2-6 in the intervals. Stylopodium thick, broadly conic.

P. integerrima (L.) A. Gray. Stem smooth, glaucous, 1-3 feet high; leaves 2-3-ternate, leaflets ovate to lanceolate, entire; fruit broadly oblong; stylopodium small or wanting. Rocky woods; May-June; common.

ZIZIA Koch. Glabrous perennials, with undivided or ternately divided leaves, and yellow flowers. Involucre wanting. Involucels of small bractlets. Calyx-teeth prominent. Fruit glabrous, with slender ribs; oil-tubes large, solitary, in the intervals and one in each rib. Stylopodium wanting. A genus distinguished from *Thaspium* by the wingless fruit.

Z. aurea (L.) Koch. Stem 2-3 feet high, radical leaves long-petioled, all except the uppermost 2-3-ternate; leaflets ovate to lanceolate, sharply serrate, sometimes incisely lobed or parted; rays 15-20; fruit oblong. Low grounds, prairies and meadows; May-June; common.

Z. cordata (Walt.) DC. Stem 2-3 feet high; lower leaves long-petioled, ovate to orbicular, crenate, base deeply cordate, stem leaves short-petioled, ternate or quinate, segments ovate or oval, crenate or lobed; rays 7-16; fruit ovate or oval. Woods; May-June; Lyon county.

ARALIACEAE Vent. GINSENG FAMILY.

Ours perennial herbs or shrubs, with alternate pinnate leaves, and umbellate flowers. Petals not inflexed, valvate in the bud. Styles usually 2-5. Ovary 2-5-celled; cells 1-ovuled. Fruit a 2-5-celled drupe.

ARALIA. Leaves alternate, decompound; styles 5.

PANAX. Leaves verticillate, palmately 3-7-foliate; styles 2-3,

ARALIA L. Herbs or shrubs from thick perennial roots. Flowers white or greenish, more or less polygamous. Calyx-tube adherent to the ovary, limb 5-toothed. Petals 5, oblong, spreading, deciduous. Stamens 5, alter-

nate with the petals. Styles slender, recurved above, persistent. Cells of the ovary with a single suspended ovule.

A. racemosa L. *Spikenard.* Stem smooth, branched; leaves large, biter-nate-pinnate; leaflets ovate, base cordate, doubly serrate, taper-pointed; umbels numerous, racemose; styles 5, united; fruit 5-celled. Rich woods; July; frequent.

A. naudicaulis L. *Wild Sarsaparilla.* Nearly stemless; roots long, horizontal; leaf long-stalked, ternate, divisions 3-5-foliolate; leaflets ovate, taper-pointed, serrate; umbels 2-5, on a scape shorter than the leaf-stalk; fruit 5-celled. Rich woods; May-June; infrequent; Winneshiek, Allamakee, Fayette, Scott, Muscatine, Henry, Johnson, Story, and Winnebago counties.

A. spinosa L. *Hercules Club.* A shrub or low tree, 8-30 feet high, stem and stalks prickly; leaves long-petioled, bipinnate; leaflets ovate, pointed, serrate, glaucous and more or less pubescent beneath; umbels in terminal compound panicles, peduncles and pedicels pubescent; flowers white. Rich soil; June-August; an escape from cultivation; Johnson county.

PANAX L. Ours a perennial herb, from a fusiform, simple or branched root. Leaves at the summit of the stem, verticillate, digitately compound. Umbel simple, solitary, terminal. Calyx-limb obscurely 5-toothed. Petals 5, spreading. Stamens 5, alternate with the petals. Styles 2-3.

P. quinquefolia L. *Ginseng.* Stem slender, 1-foot high; leaves palmately 3-7-foliolate; leaflets mostly 5, stalked, obovate-oblong, taper-pointed, coarsely serrate; flowers greenish yellow; styles 2; fruit 2-celled, bright red. Rich woods; July-August; becoming infrequent; Winneshiek, Fayette, Jackson, Delaware, Muscatine, Henry, Johnson, Story, and Cerro Gordo counties. (*A. quinquefolia* Dec. & Pl.)

CORNACEAE Link. Dog-Wood FAMILY.

Ours shrubs, with simple opposite or alternate exstipulate leaves, and cymose flowers. Calyx-tube adherent to the 1-2 celled ovary; limb minute, toothed or lobed. Petals valvate in the bud, distinct, alternate with the calyx-teeth, epigynous, sometimes wanting. Stamens as many as the petals, and alternate with them. Ovules pendulous. Fruit a 1-2-seeded drupe, crowned with the calyx.

CORNUS L. Leaves with one exception opposite, entire. Flowers perfect, white in our species. Sepals, petals, and stamens 4. Style 1, slender; stigma terminal, flat or capitate. Drupe with a 2-celled, 2-seeded stone.

* *Leaves opposite.*

† *Leaves glabrate or minutely pubescent beneath.*

C. paniculata L'Her. *Panicled Cornel. Dogwood.* A shrub 3-10 feet high, branches erect, grayish, smooth; leaves lanceolate or ovate-lanceolate, long-acuminate, base acute, minutely appressed-pubescent on both sides, pale beneath; flowers cymose-paniculate, white; fruit globose, white; stone subglobose, slightly furrowed. Rich soil, woods and thickets; May-June; common. (*C. candidissima* Marsh.)

C. stolonifera Mx. *Red-osier Dogwood.* Shrub 3-12 feet high, multiplies freely from stolons thus forming clumps; the branches bright red-purple, glabrous or slightly appressed pubescent; leaves oval, ovate, or ovate-lanceolate, acute or short acuminate, base rounded or narrowed, minutely pubescent on both sides, whitish beneath; flowers in flat-topped cymes, white; fruit

whitish or white, globose; stone variable. Moist soil; June-July; a species frequently reported but is confused with the others

† † Leaves downy-pubescent beneath, sometimes becoming glabrate.

C. sericea L. *Silky Cornel. Kinnikinnik.* A shrub 3-10 feet high; branches mostly purplish; branchlets and inflorescence silky-downy; leaves lanceolate, ovate or elliptical, base rounded or acute, glabrous above, white or silky-downy often rusty beneath; cymes broad, flat, compact; calyx-teeth lanceolate, conspicuous; fruit globose, pale blue; stone oblique, base somewhat pointed. Moist woods; May-July; common. (*C. amomum* Mill.)

C. asperifolia Mx. Shrub 4-8 feet high; branches reddish brown, mostly pubescent; branchlets and inflorescence rough-pubescent; leaves narrowly ovate to round-ovate or oblong, more or less acuminate, base acute or obtuse, rough pubescent above, whitish and roughish woolly beneath; cymes loose, broad, often paniculate; calyx-teeth small; petals oblong-lanceolate, white; fruit globose, white; stone slightly furrowed. Low woods; May-June; common.

• *C. circinata* L'Her. A shrub 4-10 feet high; branches greenish, warty, glabrous; leaves broadly oval, acuminate, white; tomentose beneath; cymes depressed, dense; fruit globose, light blue; stone globose, ridged. Rich woods, May-June; rare; Winneshiek, Fayette, and Cerro Gordo counties, reported from Story and Benton counties.

* * Leaves alternate.

C. alternifolia L. f. Shrub 8-20 feet high; leaves often clustered at the ends of the branches, oval, acuminate, base narrowed or rounded, hoary beneath; cymes pubescent; fruit globular, blue; stone obovoid. Rocky woods; May-July; rather rare; Fayette, Jackson, Delaware, Muscatine, Henry, and Johnson counties.

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ERRATA.

Errors are an especial nuisance.

Page 3 line 2 for petiolate read petiolulate.

Page 3 line 37 for preceeding read preceding.

Page 3 line 46 for Emmett read Emmet.

Page 4 line 28 for petiolate read petiolulate.

Page 16 line 38 for preceeding read preceding.

Page 16 line 39 for foliate read foliolate.

Page 27 line 6 for trifoliate read trifoliolate.

Page 28 line 1 for Celistraceae read Celastraceae.

Page 31 line 8 for preceeding read preceding.

Page 31 line 14 for mountaim read mountain.

Page 31 lines 27 and 44 for foliate read foliolate.

Page 33 line 7 coralla read corolla.

Page 33 lines 26, 32, 37, 41, and 45 for foliate read foliolate, and so on through the Pea Family.

Page 53 line 29 for Emmett read Emmet.

Page 60 line 44 for globrous read glabrous.

Page 60 line 44 for galbous read globose.

All other mistakes are so obvious that the reader may correct, overlook or condemn at his pleasure.

MANUAL
OF THE
FLOWERING PLANTS

OF
IOWA

PART 2. GAMOPETALAE.

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BY
T. J. FITZPATRICK.
Fellow of the Iowa Academy of Sciences

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ANALYTICAL KEY TO THE FAMILIES.

Division 2. GAMOPETALAE: calyx and corolla usually present, the petals more or less united. Polypetalous forms occur in the Asclepiadaceae, Oleaceae, Pyrolaceae, and the Monotropaceae, and apetalous forms occur in the Oleaceae as noted at the end of the key.

A. *Stamens more numerous than the lobes of the corolla.*

Stamens free from the corolla or merely adnate to its base.

Ovary superior, 4-5-celled; fruit a capsule.

Low evergreen perennials.

PYROLACEAE, 102.

Waxy-white parasitic plants.

MONOTROPACEAE, 103.

Ovary inferior, adnate to the calyx; fruit a many-seeded berry.

VACCINIACEAE, 103.

Stamens borne on the tube or at the base of the corolla.

Leaves alternate.

EBENACEAE, 105.

Leaves opposite and basal.

ADOXACEAE, 69.

B. *Stamens as many as the lobes of the corolla and inserted on the tube opposite the lobes.*

PRIMULACEAE, 104.

C. *Stamens as many as the lobes of the corolla and inserted alternate with them, or fewer.*

* Ovary inferior, adherent to the calyx-tube.

† Anthers united, except in *Kuhnia* of the Compositae, the Ambrosiaceae, and many of the Campanulaceae.

Flowers in involucrate heads.

Flowers all ligulate; juice milky.

CICHORIACEAE, 97.

Flowers tubular or the outer ligulate; juice rarely milky.

Stamens distinct or nearly so.

AMBROSIACEAE, 95.

Stamens united by their anthers around the style.

COMPOSITAE, 72.

Flowers not in involucrate heads.

CAMpanulACEAE, 101.

† † Stamens inserted on the corolla; anthers separate.

Stamens in ours 3, fewer than the corolla-lobes.

VALERIANACEAE, 71.

Stamens as many as the corolla-lobes, one less in *Linnaea* of the Caprifoliaceae.

Leaves opposite or verticillate, usually stipulate.

RUBIACEAE, 70.

Leaves opposite, exstipulate.

CAPRIFOLIACEAE, 67.

* * Ovary superior.

† Corolla irregular, more or less 2-lipped; stamens 4 and didynamous, or only 2.

‡ Carpels 1—2-seeded.

Ovary 4-lobed, becoming 4 1-seeded nutlets.

LABIATAE, 131.

Ovary not lobed; carpels separating into 1-seeded nutlets.

VERBENACEAE, 130.

‡ ‡ Carpels 2—many-seeded.

Ovary 1-celled; stamens 2; marsh or aquatic herbs.

LENTIBULARIACEAE, 128.

Ovary 1-celled; stamens 4; brownish or whitish parasitic herbs.

OROBANCHACEAE, 127.

Ovary 1-celled or becoming partially 4-celled; fruit with 2 long recurved beaks.

MARTYNIACEAE, 129.

Ovary and capsule 2-celled; placentae parietal; seeds winged in our species; small trees or woody vines.

BIGNONIACEAE, 128.

Ovary and capsule 2-celled; placentae axile.

SCROPHULARIACEAE, 120.

Seeds usually many.

ACANTHACEAE, 129.

Seeds few, borne on curved projections.

† † Corolla somewhat irregular; stamens 5.

Ovary deeply 4-lobed.

Echium, in BORRAGINACEAE, 112.

Ovary not lobed; filaments bearded. <i>Verbascum</i> , in SCROPHULARIACEAE, 121.	
† † † <i>Corolla irregular.</i>	
† <i>Stamens of the same number as the lobes of the corolla.</i>	
Ovaries 2, separate; stigmas and sometimes the styles united.	
Filaments distinct; pollen granular. <i>APOCYNACEAE</i> , 106.	
Filaments monodelphous; pollen in waxy-masses. <i>ASCLEPIADACEAE</i> , 107.	
Ovary deeply 4-lobed.	
Leaves alternate. <i>BORRAGINACEAE</i> , 112.	
Leaves opposite. <i>Mentha</i> , in LABIATAE, 133.	
Ovary 1, not deeply lobed, 1-celled, 1-ovuled. <i>PLANTAGINACEAE</i> , 139.	
Ovary 1-celled, with the ovules parietal or in 2 parietal placentae.	
Leaves opposite. <i>GENTIANACEAE</i> , 109.	
Leaves basal or alternate, 3-foliate. <i>MENYANTHACEAE</i> , 110.	
Leaves basal or alternate, toothed, lobed, or compound. <i>HYDROPHYLACEAE</i> , 111.	
Ovary 2–10 celled.	
Leafless white or yellowish parasitic vines. <i>CUSCUTACEAE</i> , 116.	
Leaves alternate and stipulate or opposite and exstipulate; stamens inserted on the tube of the corolla.	
Stamens 4; capsule 2-celled, circumscissile. <i>PLANTAGINACEAE</i> , 139.	
Stamens 4; ovary 2–4-celled, becoming 2–4 1-seeded nutlets. <i>VERBENACEAE</i> , 130.	
Stamens usually 5.	
Fruit of 4 1-seeded nutlets, or of 2 2-seeded carpels. <i>BORRAGINACEAE</i> , 112.	
Fruit a few-seeded capsule.	
Calyx 5-cleft; style 3-lobed or 3-cleft. <i>POLEMONIACEAE</i> , 110.	
Calyx of 5 distinct sepals; styles 1 or 2, 2-cleft or entire; mostly twining vines.	
Leaves normal. <i>CONVOLVULACEAE</i> , 115.	
Leaves reduced to minute scales. <i>CUSCUTACEAE</i> , 116.	
Fruit a many-seeded capsule or berry; style solitary. <i>SOLANACEAE</i> , 117.	
† † <i>Stamens less in number than the lobes of the corolla.</i>	
Stamens 4, didynamous.	
Ovary 2-celled; cells several-ovuled. <i>ACANTHACEAE</i> , 129.	
Ovary 2–4-celled; cells 1-ovuled. <i>VERBENACEAE</i> , 130.	
Stamens with anthers 2; ovary 4-lobed. <i>Lycopus</i> , in LABIATAE, 133.	
Stamens 2; ovary 2-celled.	
Herbs. <i>Veronica</i> , in SCROPHULARIACEAE, 124.	
Trees or shrubs. <i>OLEACEAE</i> , 106.	
<hr/>	
Polypetalous forms in gamopetalous families.	
Ovaries 2, separate. <i>ASCLEPIADACEAE</i> , 107.	
Ovary 1, compound.	
Stamens 2, rarely 3 or 4; petals 4. <i>OLEACEAE</i> , 106.	
Stamens in ours 8 or 10; petals 4 or 5.	
Low evergreen perennials. <i>PYROLACEAE</i> , 102.	
Waxy-white parasitic plants. <i>MONOTROPACEAE</i> , 103.	
Apetalous forms in gamopetalous families.	
Trees or shrubs; fruit a 1-celled 1-seeded samara or drupe. <i>OLEACEAE</i> , 106.	

GAMOPETALAE: those with both calyx and corolla present, the latter having its petals more or less united, rarely separate or wanting.

CAPRIFOLIACEAE *Vent.* HONEYSUCKLE FAMILY.

Shrubs or herbs, with opposite exstipulate leaves, and perfect mostly 5-parted regular or irregular flowers. Calyx-tube adherent to the ovary. Corolla monopetalous, tubular, or rotate. Stamens inserted on the calyx-tube, usually of the same number as the lobes, one less in *Linnaea*. Style 1; stigmas 3-5. Fruit a berry, drupe, or capsule, 1-several-seeded.

Tribe Lonicereae. Corolla tubular, limb regular or irregular; style filiform.

* *Herbs; flowers axillary; corolla 5-lobed.*

LINNAEA. Stamens 4.

TRIOSTEUM. Stamens 5.

* * *Shrubs, erect or climbing.*

SYMPHORICARPOS. Stamens 4-5; berry 4-celled, 2-seeded.

LONICERA. Corolla tubular; stamens 5; berry 2-3-celled.

DIERVILLA. Stamens 5; fruit a 2-celled, 2-valved, many-seeded capsule.

Tribe Sambuceae. Corolla regular, deeply 5-lobed, rotate; stigmas 3-5, mostly sessile.

SAMBUCUS. Leaves pinnate; fruit a 3-seeded berry.

VIBURNUM. Leaves simple; fruit a 1-celled, 1-seeded drupe.

LINNAEA L. A single species, creeping, evergreen, perennial. Leaves roundish, slightly crenate, petiolate. Peduncle slender, erect, 2-flowered. Calyx small, 5-parted, deciduous. Corolla campanulate, lobes 5, about equal. Stamens 4, 2 longer, inserted toward the base of the corolla. Style slightly exserted; stigma capitate.

L. borealis L. Somewhat pubescent; stems 6-30 inches long; pedicels from the axils of small branchlets; flowers nodding; corolla roseate, fragrant, about a half inch long. Moist woods; June; infrequent; Winneshiek county.

TRIOSTEUM L. Coarse perennials, with opposite ample more or less connate entire leaves, and sessile axillary flowers. Calyx-tube ovoid, limb of 5 nearly linear segments. Corolla tubular, but little exceeding the calyx, gibbous at the base, limb of 5 nearly equal lobes. Stamens 5, included. Style 1, exserted; stigma capitate, lobed. Ovary 3-celled, forming a drupe. Seeds 3, bony, ribbed.

T. perfoliatum L. Fever-wort. Horse Gentian. Stems 2-4 feet high, simple, soft-pubescent to hirsute; leaves oval, acuminate, contracted toward the base; flowers usually clustered, brownish purple, drupe orange color. Up-land woods; May-June; common.

T. angustifolium L. Stem 2-6 feet high, hairy; leaves lanceolate, acuminate, tapering to the base, hardly connate; flowers mostly solitary, yellowish. Woods; May-July; infrequent; Johnson and Lee counties.

SYMPHORICARPOS Juss. Low branching shrubs, with opposite oval short-petioled entire leaves and small roseate axillary flowers. Calyx-tube globose, teeth 4-5, short, persistent. Corolla campanulate, limb regular, 4-5-lobed. Stamens 4-5, short, inserted in the throat of the corolla. Stigmas capitate. Fruit a globose berry, 4-celled, 2 of the cells with a single seed, the others abortive.

S. vulgaris Mx. Indian Currant. Coral-berry. Stems slender, 2-4 feet high; leaves nearly sessile, downy beneath; flowers in short thick clusters;

stamens and bearded style included; berries small, red. Along streams and bordering uplands; July; common but confined mostly to the southern half of the state; Lee, Henry, Jefferson, Van Buren, Wapello, Appanoose, Monroe, Decatur, Lucas, Ringgold, Union, Clark, Adams, Taylor, Page, Montgomery, Fremont, Pottawattomie, Harrison, Monona, Shelby, Ida, Woodbury, Sioux, Lyon, and Story counties. (*S. symphoricarpos* (L.) MacM.)

S. occidentalis Hook. *Wolfberry*. Leaves petioled; flowers larger than those of the preceding, spicate, axillary, terminal; corolla bearded within; stamens and glabrous style exserted; berries white. Upland woods; June-July; frequent; Emmet, Lyon, Dickinson, Shelby, Pottawattomie, Fremont, Page, Winnebago, Story, Fayette, and Winneshiek counties.

LONICERA L. Bushy or climbing shrubs, with opposite entire leaves, and usually showy flowers. Calyx-tube subglobose; teeth 5, very short. Corolla tubular or funnel-form; limb in 4 or 5 often unequal lobes. Stamens 5, exserted. Stigma capitate. Ovary 2-3-celled, becoming a few-seeded berry.

L. sullivantii Gray. *Honeysuckle*. Stems climbing, 3-6 feet high; leaves glabrous, often much glaucous, sessile, mostly connate-perfoliate, oval or ovate, the upper pair forming an orbicular disk; corolla pale yellow, hairy within, tube half inch long, limb shorter; filaments nearly glabrous; berries red. Woods; June; common; Winneshiek, Allamakee, Clayton, Dubuque, Fayette, Jackson, Delaware, Muscatine, Johnson, Henry, Fremont, Pottawattomie, Winnebago, Chickasaw, Cerro Gordo, and Emmet counties.

L. glauca Hill. Stems 3-4 feet high, usually bushy; leaves glabrous, less glaucous, oblong, upper pairs connate; flowers greenish yellow or purplish, tube short, limb nearly as long, hirsute within; style and base of the filaments hirsute; berries yellow. Woods; May-June; common; Winneshiek, Allamakee, Fayette, Story, and Emmet counties, specimens referred to this species have been collected in Delaware, Johnson, Cerro Gordo, Henry, and Calhoun counties. (*L. diotica* L.)

L. tartarica L. *Bush Honeysuckle*. An erect glabrous shrub, 5-10 feet high, with ovate short petioled leaves, and pinkish or whitish flowers on axillary bracted peduncles. Frequently cultivated; has been collected along the Volga river, Fayette county, probably an escape.

DIERVILLA Moench. Leaves petioled, ovate, acuminate, serrate. Flowers in axillary cymes. Calyx-tube oblong, the limb of 5 linear segments. Corolla funnel-form, nearly regular, 5-lobed, twice the length of the calyx. Stamens 5, exserted. Fruit a capsule, 2-celled, 2-valved, many-seeded.

D. trifida Moench. A small shrub, 4-6 feet high, with taper-pointed leaves, and pale yellow flowers; capsule oblong, with a slender beak, crowned with the persistent calyx-lobes. Bluff thickets; June-July; infrequent; Winneshiek, Fayette, and Muscatine counties. (*D. diervilla* (L.) MacM.)

SAMBUCUS L. Small shrubs, with simple pinnate leaves, and small cymose white flowers. Calyx-lobes small, 5 or none. Corolla-limb 5-cleft, spreading, segments obtuse. Stamens 5. Stigmas 3. Fruit a pulpy berry, 3-seeded.

S. canadensis L. *Common Elder*. Stems more or less woody, 4-10 feet high, with a large white pith, leaflets 5-11, ovate-oblong, acuminate, smooth; fruit dark purple. Rich soil, fields and open woods; June-July; common.

S. racemosa L. *Red-berried Elder*. Stems woody, 3-10 feet high, with a reddish-brown pith; leaflets 5-7, ovate-lanceolate, acuminate, slightly downy beneath; cymes panicled; fruit red. Woods; flowers in May, fruit ripe in

June; infrequent; Winneshiek, Clayton, Fayette, Delaware, and Scott counties. (*S. pubens* Mx.)

VIBURNUM L. Small trees or shrubs, with simple leaves, and white flowers in compound cymes. Calyx small, persistent, 5-toothed. Corolla rotate, deeply 5-lobed, segments obtuse. Stamens 5. Stigmas 1-3, sessile. Fruit a 1-celled, 1-seeded drupe. Petioles frequently minutely stipulate.

V. lentago L. *Sweet Viburnum. Sheep-berry.* Shrub or small tree, 8-30 feet high; leaves ovate, long-acuminate, closely and sharply serrate, with long-margined petioles; cymes 3-5 rayed, sessile; drupes oval, half inch long, ripe in autumn, edible. Woods; May-June; frequent throughout the state.

V. prunifolium L. *Black Haw.* Similar to the preceding; leaves oval, obtuse or acutish, finely serrulate. Low woods; May-June; rare; Johnson county, reported from Humboldt county.

V. pubescens (Ait.) Pursh. *Downy-leaved Arrow-wood.* Shrub 2-3 feet high; leaves ovate to oblong-ovate, short acuminate, broadly dentate, pinnately veined, downy when young, base cordate, short-petioled or nearly sessile; drupe dark purple, oval; stone flattish, slightly 2-grooved on both surfaces. Rocky woods; May-June; infrequent; Emmet, Fayette, Johnson, Henry, Decatur, Story, and Cerro Gordo counties. A form of this species with the characteristic fruit but the petioles a half inch or more long is found in Johnson county. The forms referred to the next species may belong here.

V. dentatum L. *Arrow-wood.* A shrub, 4-10 feet high; branches slender, glabrous, gray; leaves ovate, oval or orbicular, acute or short-acuminate, coarsely dentate, both sides glabrous or pubescent in the axils of the veins beneath, base rounded or slightly cordate, petioles one-fourth of an inch to an inch long, glabrous; drupe globose-ovoid, blue, becoming blackish; stone deeply grooved on one side, rounded on the other. Woods; May-June; infrequent; forms have been referred to this species from Jackson, Delaware, Johnson, Henry, Winnebago, and Dallas counties.

V. opulus L. *Cranberry-tree. Wild Guelder-rose.* Shrub 5-12 feet high; leaves deeply 3-lobed, 3-ribbed, broadly ovate, base rounded or truncate, lobes acuminate, dentate, entire in the sinuses; petioles stipuled, and with 2 glands above; drupes globose or oval, red, acidic. stone orbicular, flat, not grooved. Woods; June-July; rather rare; Allamakee and Delaware counties, reported from Fayette county.

ADOXACEAE Fritsch. MOSCHATEL FAMILY.

Dwarf perennial herbs, with scaly or tuberous rootstocks, basal and opposite ternately divided leaves, and capitate cluster of greenish flowers. Calyx-limb of 3 or more teeth. Corolla rotate, 4-6-lobed. Stamens of 4-6 pairs, in the sinuses of the corolla, separate or partly united; anthers peltate, 1-celled. Style 3-5-parted. Fruit a greenish drupe, with 3-5 cartilaginous nutlets. Represented by the monotypic genus **ADOXA** L.

A. moschatellina L. *Musk-root. Moschatel.* Smooth, 3-5 inches high, radical leaves 1-4, ternately compound, long-petioled; caudine leaves a single pair, 3-parted or 3-cleft; flowers greenish or yellowish, 4-5 in a slender pedunculate glomerule. Rocky woods; May; rather rare; Winneshiek county, reported from Fayette and Floyd counties.

RUBIACEAE B. Juss. MADDER FAMILY.

Shrubs or herbs, with opposite or verticillate entire leaves. Stipules leaf-like, connecting the bases of the petioles or none. Flowers perfect but frequently of two forms in *Houstonia*. Calyx-tube adherent to the ovary; limb 4-5-cleft. Corolla regular, inserted upon the calyx-tube; lobes 4-5. Stamens 4-5, inserted on the corolla-tube, alternate with its lobes. Styles 1-2. Ovary 2-4-celled. Fruit a capsule, berry, or a drupe.

HOUSTONIA. Low herbs, with opposite leaves, and solitary or cymose flowers.

CEPHALANTHUS. Leaves opposite or in 3's; flowers in dense globular peduncled heads.

GALIUM. Leaves verticillate; stipules wanting; flowers cymose.

***HOUSTONIA* L.** Low herbs. Stipules small, entire, connate with the petioles. Flowers solitary or cymose, white or bluish. Calyx 4-toothed or 4-lobed, persistent, the lobes becoming distinct in fruit. Corolla tubular, with 4 spreading lobes, longer than the calyx. Stamens 4, inserted on the throat of the corolla. Style 1; stigmas 2. Ovary 2-celled. Fruit capsular, few-several-seeded. Flowers often dimorphous, that is some flowers with exserted style and included stamens, others with included style and exserted stamens.

H. minima Beck. *Least Bluet*. Annual; stem 1-4 inches high, glabrous; radical leaves spatulate or ovate, caudine leaves ovate to linear; peduncles axillary, the earlier ones usually 1 inch long, later ones shorter; flowers violet or purple; calyx-lobes conspicuous; corolla-lobes about equaling the tube. Fields and prairies; March-May; common; Johnson county.

H. angustifolia Mx. Perennial; stems tufted, from a woody root, 4-20 inches high; leaves often fascicled, narrowly linear, 1-nerved; flowers numerous, in compact terminal cymes, white or purplish, short-pedicelled; lobes of the corolla bearded inside; capsule ovoid. Prairies; June-July; frequent; Taylor, Fremont, and Shelby counties; reported from Pottawattamie, Harrison, and Woodbury counties.

***CEPHALANTHUS* L.** Shrubs, with white flowers in dense globose peduncled heads. Calyx-limb 4-toothed. Corolla tubular, 4-cleft. Stamens 4. Style 1, filiform, much exserted; stigma capitate; fruit dry, 2-4-celled.

***C. occidentalis* L.** *Button-bush*. Shrub 2-10 feet high; leaves opposite or in 3's, ovate to lance-oblance, pointed, petioled; stipules small, triangular. Low grounds, along streams and swamps; July-August; frequent in the southeast quarter of the state but rarer elsewhere; Allamakee, Clayton, Clinton, Jackson, Scott, Muscatine, Louisa, Lee, Henry, Johnson, Appanoose, Story, Decatur, Page, Fremont, and Humboldt counties.

***GALIUM* L.** Herbs, with angled stems, verticillate leaves, and cymose flowers. Calyx-limb of four small teeth. Corolla rotate, 4-cleft, valvate in the bud. Stamens 4, short. Styles 2. Fruit globular, dry or fleshy, separating into 2, 1-seeded, indehiscent carpels.

***G. aparine* L.** Annual, stems 2-4 feet long, weak, reclining, retrorsely prickly; leaves usually in 8's, sometimes in 6's or 7's, oblanceolate to linear, mucronate, peduncles axillary, 1-2-flowered; fruit densely covered with hooked prickles. Low woods; May-August; common.

***G. circaezans* Mx.** *Wild Liquorice*. Perennial, stem 1-2 feet high, branched, downy or smooth; leaves large, in 4's, oval or ovate-lanceolate, 3-nerved, obtuse; peduncles few-flowered; fruit nearly sessile, hispid. Rich woods; May-July; frequent; Johnson, Henry, Muscatine, Lee, Van Buren, Decatur, Fremont, and Pottawattamie counties.

G. boreale L. *Northern Bedstraw*. Perennial, stem 1-3 feet high, rigid, smooth and glabrous; leaves in 4's, linear-lanceolate, acute, 3-nerved; flowers white, numerous, in terminal panicles; fruit hispid or smooth. Low prairies and rocky woods; May-August; common; Winnesheik, Allamakee, Fayette, Jackson, Jones, Floyd, Cerro Gordo, Hancock, Emmet, Dickinson, and Lyon counties.

G. trifidum L. *Small Bedstraw*. Perennial, stem weak, decumbent or suberect, diffusely branched, retrorsely roughish on the angles; leaves mostly in 4's, sometimes in 6's, linear or oblanceolate, obtuse, margins and midrib rough; peduncles 1-7-flowered; flowers white, frequently 3-parted, pedicels capillary; fruit smooth. Wet woods; June-July; common. This species varies much. Variety *PUSILLUM* Gray is a small form with narrow linear leaves, in 4's, and peduncles 1-2-flowered. Variety *LATIFOLIUM* Torr., usually less branched; leaves in 4's, ovate, obtuse or oblanceolate; peduncles about 3-flowered; flowers 4-parted. These are the varieties given in Gray's Manual. They are not now recognized.

G. concinnum T. & G. Similar to the preceding, perennial; stem decumbent, much branched, angles scabrous; leaves all in 6's, linear, slightly pointed, 1-nerved, margins scabrous upward, peduncles filiform, 2-3 times forked; flowers small, numerous, cymose, white; fruit smooth. Dry woods; June-July; common.

G. triflorum Mx. *Sweet-scented Bedstraw*. Perennial, diffuse, procumbent or ascending; stem 1-3 feet long, weak, rough on the angles; leaves in 6's, narrowly oval or elliptical-lanceolate, cuspidate, 1-nerved, margins rough; peduncles 3-flowered; flowers greenish, pedicelled; fruit clothed with hooked bristles. Rich woods; June-July; common; Jackson, Jones, Muscatine, Johnson, Decatur, Story, Winnebago, and Emmet counties.

G. asprellum Mx. *Rough Bedstraw*. Perennial; stem diffuse, much branched, retrorsely hispid; leaves in 6's or in 4's and 5's on the branches, lanceolate, acuminate or cuspidate, margins and midrib retrorsely prickly; peduncles 2-3 times forked; flowers white; fruit smooth and glabrous. Alluvial soil; June-August; reported from Jones, Lee, Johnson, and Cerro Gordo counties, perhaps frequent.

VALERIANACEAE Batsch. VALERIAN FAMILY.

Herbs, with opposite exstipulate leaves, and cymose-clustered flowers. Calyx-tube adherent to the ovary; limb sometimes pappus-like. Corolla tubular or funnel-form, 4-5-lobed. Stamens inserted on the corolla tube, alternate with the lobes and usually fewer in number. Ovary inferior, 3-celled, but one cell fertile and 1-ovuled. Fruit indehiscent, with a single suspended ovule.

VALERIANA. Fruit 1-celled; calyx-lobes becoming pappus-like.

VALERIANELLA. Fruit 3-celled; calyx-lobes minute or obsolete.

VALERIANA L. Perennial herbs, with strong-scented roots, mostly pinnate leaves, and dioecious or dimorphous flowers. Calyx-limb small at first but evolving a plumose pappus as the seed develops. Corolla limb 5-lobed, nearly regular. Stamens 3. Fruit 1-celled, 1-seeded.

V. edulis Nutt. *Edible Valerian*. Stem 1-4 feet high, thick, smooth; root ample, spindle-shaped, edible; leaves densely ciliate, radical spatulate, caulinne pinnately parted into 3-7 long and narrow divisions; flowers whitish,

polygamо-dioecious, in cymose clusters, disposed in a long narrow interrupted panicle. Low prairies; May-June; common; Winneshiek and Fayette counties.

VALERIANELLA Poll. Annual branched herbs, with tufted basal leaves, and terminal capitate, corymbed or paniced flowers. Calyx-limb short and toothed or obsolete. Corolla small, 5-lobed, nearly regular. Stamens 3. Fruit 3-celled, one cell 1-seeded, the others empty.

V. chenopodifolia (Pursh) DC. Stem glabrous, 1-2 feet high; lower and basal leaves spatulate, obtuse, sometimes repand, the upper oblong or lanceolate, entire, sessile; flowers in dense cymes; corolla white; fruit triangular-pyramidal, glabrous or pubescent. Moist soil; May-July; reported from Lee county by Arthur.

COMPOSITAE *Adans.* THISTLE FAMILY.

Ours herbs, with watery or resinous sap, and opposite alternate or basal exstipulate leaves. Flowers perfect, pistillate or neutral, infrequently monœcious or dioecious, few or many borne on a common receptacle which is subtended by a common involucre composed of few or many bracts arranged in one or more series. Receptacle naked or chaffy, smooth, pitted or honeycombed. Calyx-tube adherent to the ovary, the limb wanting or of bristles, teeth, scales, awns, or crown-like or cup-like and is known as the pappus. Corolla tubular, 5-lobed or 5-cleft or the marginal flowers with a strap-shaped or ligulate corolla; the heads are radiate when the ray-flowers are present, discoid when absent, the tubular are the disk-flowers. Stamens usually 5, borne on the corolla and alternate with its lobes, the anthers united into a tube which sheathes the style, syngenesious, distinct or nearly so in *Kuhnia*, sometimes appendaged at the apex or sagittate or tailed at the base, the pollen grains globose, rough or echinate. Ovary 1-celled, 1-ovuled; style of the fertile flowers 2-cleft, the branches various and naked or variously appendaged; stigmas marginal; style of sterile flowers usually undivided. Fruit an achene. A large family and well represented in Iowa. Some writers include the two following families with this one.

Tribe Vernonieæ. Heads discoid; flowers tubular, perfect, never yellow; style-branches filiform or subulate; leaves alternate or scattered.

VERNONIA. With us the only genus.

Tribe Eupatoreiæ. Heads discoid; flowers tubular, perfect, never yellow; style-branches thickened upward, obtuse, minutely pubescent; leaves alternate, opposite or whorled.

EUPATORIUM. Achenes 5-angled; pappus of numerous capillary bristles; involucral bracts more than 4.

KUHNIA. Achenes 10-ribbed; involucral bracts striate-nerved; pappus strongly plumose.

LITTRIS. Achenes 10-ribbed; involucral bracts faintly striate; pappus plumose or barbellate; heads spicate or racemose.

Tribe Astereiæ. Heads radiate or discoid; style-branches of the perfect flowers flattened, with triangular appendages above; flowers often yellow; anthers not tailed at the base; leaves alternate.

GRINDELIA. Heads large; flowers fertile, many; pappus of caducous awns.

CHRYSOPSIS. Heads many-flowered; pappus double, the outer of chaffy scales, the inner of capillary bristles.

APLOPAPPUS. Heads many-flowered, radiate; pappus persistent, of many unequal bristles; achenes white-tomentose.

SOLIDAGO. Heads small, radiate, few-many-flowered, yellow, rarely white; pappus of numerous nearly equal capillary bristles.

BOLTONIA. Heads many-flowered; rays white or purplish, disk yellow: pappus of a few short bristles and 2-4 awns.

ASTER. Heads usually small, many-flowered, on leafy peduncles: rays white, blue or purple, disk yellow; involucre well imbricated, pappus simple, copious, of capillary bristles; achenes flattish.

ERIGERON. Heads many-flowered, on naked peduncles; involucre but little imbricated; pappus a single row of capillary bristles with intermixed smaller ones or with an outer pappus of scales or little bristles; achenes flattened.

Tribe Inuleae. Heads usually small, discoid, except in *Inula* where the rays are large and yellow; anthers sagittate, unappendaged above, tailed below; style-branches obtuse or truncate, naked: pappus capillary or none. Our species have the receptacle not chaffy.

ANTENNARIA. Heads dioecious; pappus of the staminate flowers club-shaped, of the pistillate flowers united at the base and falling away together.

ANAPHALIS. Heads dioecious or polygamo-dioecious; pappus not club-shaped nor united at the base.

GNAPHALIUM. Heads with all the flowers fertile; pappus capillary.

INULA. Heads large, many-flowered, with yellow rays; pappus of rough capillary bristles.

Tribe Helianthae. Heads radiate or discoid; involucre herbaceous or foliaceous; receptacle chaffy; pappus a cup or crown, or awns, bristles or scales, never capillary, sometimes none; style-branches truncate or hairy-appendaged.

* *Disk flowers perfect, but sterile, the rays fertile.*

POLYMNIA. Involucral scales in 2 rows, the 5 outer foliaceous; achenes thick, short, not flattened; pappus none

SILPHIUM. Involucral scales thick, imbricated in several rows; achenes flattened, wing-margined, in several rows; rays in 2 or 3 series; pappus none or 2 teeth.

PARTHENIUM. Involucral scales short, roundish, in 2 rows; achenes flattened, keeled and margined; rays 5, very short, the heads appearing discoid; pappus of 2 small scales.

** *Disk-flowers fertile; rays deciduous except in *Helopsis*, or none.*

ECLIPTA. Rays white, short; involucral scales in 2 rows; receptacle flat; chaff awn-like or bristle-like.

HELIOPSIS. Rays yellow, fertile; achenes 4-angled.

ECHINACEA. Rays rose-colored, pistillate, sterile; achenes 4-sided.

RUDBECKIA. Rays yellow, neutral; achenes 4-sided, marginless.

LEPACHYS. Rays yellow, neutral; achenes flattened laterally and margined.

HELIANTHUS. Receptacle flat or convex; achenes flattish, neither margined nor winged; pappus of 2 deciduous scales or awns.

ACTINOMERIS. Receptacle convex; achenes laterally flattened, 2-awned; leaves decurrent.

COREOPSIS. Receptacle flat; achenes flat; pappus of 2 short teeth or awns, or a mere border, or none.

BIDENS. Receptacle flat; achenes flat; pappus of 2-6 awns or teeth which are hispid or barbed.

Tribe Helenieae. Similar to the preceding tribe; receptacle not chaffy; pappus a row of chaffy scales, bristly-dissected in *Dysodia*; style-branches truncate or with hairy tips.

HELENIUM. Receptacle oblong; rays 3-5-cleft; involucral scales distinct; leaves decurrent.

DYSODIA. Receptacle flat; rays few, short; involucral scales united into a cup; ill-scented plants.

Tribe Anthemideae. Rays mostly white or none; involucral scales imbricated, usually dry and scarious; pappus a short crown or none. Strong-scented herbs with alternate leaves.

* *Receptacle chaffy.*

ANTHEMIS. Heads large; achenes terete.

ACHILLEA. Heads small; achenes flattened.

* * *Receptacle naked, sometimes hairy.*

CHRYSANTHEMUM. Heads large, many-rayed; pappus none.

TANACETUM. Heads small, corymbed, rayless; flowers yellow; pappus a short crown.

ARTEMISIA. Heads small, racemose, spicate or panicled, rayless; pappus none.

Tribe Senecioneae. Heads radiate or discoid; involucral scales little if any imbricated, not scarious; receptacle naked; pappus of soft capillary bristles.

SENECIO. Flowers yellow; heads usually radiate.

CACALIA. Flowers white or cream-colored, all perfect; heads discoid; sap often milky.

ERCHITITES. Flowers whitish, the marginal pistillate, the central perfect; heads dis-
cold.

Tribe Cynareae. Heads large, discoid; flowers tubular, perfect; involucral scales much imbricated; anthers long-tailed at the base, elongated-appended at the tip; style-branches short or united, smooth, often with a pubescent ring below.

ARCTIUM. Leaves not prickly; involucral scales hooked; pappus of rough bristles.

CNICUS. Leaves prickly; pappus-bristles plumose.

VERNONIA Schreb. *Iron-weed.* Perennials, with leafy stems, and corymbose cymes. Leaves alternate, acuminate. Heads discoid, 15-40-flowered; flowers purple, tubular, perfect. Involucre shorter than the flowers, of many imbricated scales, the inner longest. Pappus double, outer scale-like, inner copious, capillary. Receptacle naked. Achenes cylindrical, ribbed. Species are with difficulty determined.

V. fasciculata Mx. Stem 3-7 feet high, glabrous; leaves narrowly lanceolate to linear, sharply denticulate; heads many, cyme close, involucre bell-shaped, half as long as the showy flowers; scales obtuse, closely appressed. Low grounds; August-September; common.

V. noveboracensis (L.) Willd. Stem 3-6 feet high, pubescent or glabrate, leaves lanceolate, serrulate; involucre purplish, scales ovate or lance-ovate, with filiform or subulate spreading tips. Moist soil; July-September; reported from Scott, Union, Pottawattamie, and Harrison counties. Specimens from Des Moines, Lee, and Cass counties referred to this species.

V. glauca (L.) Britton. Stem 2-5 feet high, glabrous, or finely pubescent; leaves thin, the lower oval or obovate, the upper ovate-lanceolate, acute or acuminate, pale beneath, sharply serrate; inflorescence loosely branched; heads few, slender-peduncled, 10-20-flowered; involucral scales acute or acuminate, appressed. Woods, August-September; reported, but questionable. (*V. noveboracensis latifolia* Gray.)

V. baldwinii Torr. Stout, 2-5 feet high, densely tomentose-pubescent; leaves lanceolate or oblong-lanceolate, acute or acuminate, sharply serrate, seabrous above, tomentulose beneath; heads stout-peduncled; involucral scales acute or acuminate, squarrose. Dry soil; July-September. Forms from Van Buren, Appanoose, Decatur, and Ringgold counties referred to this species.

EUPATORIUM L. Perennials. Flowers in corymbose heads, white, blue, or red, never yellow, all tubular, 5-cleft. Involucre imbricate. Receptacle flat, naked. Pappus a single row of capillary seabrous bristles. Style exserted, deeply cleft. Achenes 5-angled.

E. purpureum L. *Joe-Pye Weed.* Stem simple, 3-8 feet high, often purplish, pubescent above, mostly glabrous below; leaves 3-6 in a whorl, short-petioled, large, ovate-lanceolate to lanceolate, coarsely serrate, pointed; flowers flesh-color; involucral scales numerous, imbricated in several rows. Low grounds; August-September; common.

E. altissimum L. Stem simple, 2-6 feet high, soft-pubescent, leafy; leaves opposite, sessile, lanceolate, tapering both ways, conspicuously 3-nerved, entire or toothed beyond the middle; involucral scales oblong, shorter than the heads, in about two rows, outer shorter; heads 1-5-flowered. Dry ground; August-September; frequent; eastern and southeastern counties, sparingly westward; Winnesiek, Benton, Fayette, Muscatine, Des Moines, Henry, Johnson, Story, Decatur, and Harrison counties.

E. serotinum Mx. Stem 3-6 feet high, usually branched, soft-puberulent, leaves mostly opposite, a few upper alternate, long-petioled, ovate-lanceolate, 3-nerved, coarsely serrate; heads 12-15-flowered, in compound corymbs; involucre pubescent; scales obtuse. Low ground; August-September, infrequent; Fayette, Scott, Muscatine, and Woodbury counties.

E. perfoliatum L. *Boneset*. Stem 2-4 feet high, hairy, corymbosely branched; leaves opposite or in 3's, connate-perfoliate, lanceolate, pointed, crenate-serrate, downy beneath; heads 10-15-flowered, in a dense corymb, scales narrowly lanceolate, shorter than the flower. Low grounds; August; common. The number of flowers in the head and the connate character of the leaves vary greatly.

E. ageratoides L. *White Snake-root*. Stem smooth, simple or branched, 1-3 feet high; leaves opposite, petioled, thin, broadly ovate, pointed, 3-nerved, large toothed; heads 10-20-flowered, in a compound corymb, involucral scales in one row, oblong, obtuse. Woods; July-September; common.

E. coelestinum L. *Mist-flower*. Plant pubescent or puberulent, 1-3 feet high; leaves opposite, ovate, petioled, acute or obtuse, crenate-dentate, base truncate or slightly cordate; heads cymose-corymbose; flowers blue or violet. Moist soil; August-September; reported from Lee county by Arthur.

KUHNIA L. Perennials. Heads paniculate-corymbose, cream colored, discoid, 10-20-flowered. Involucral scales narrowly linear, loosely imbricated, parallel nerved. Pappus a row of white plumose capillary bristles. Achenes, cylindrical, 10-striate.

K. eupatorioides L. Stem 2-3 feet high, erect, usually simple, minutely pubescent, leaves alternate, the upper sessile, the lower short-petioled, lanceolate or linear-lanceolate, entire or sparingly dentate, acuminate. Dry soil, August-September; common.

K. glutinosa Ell. Usually taller and stouter than the preceding, pubescent or tomentulose; leaves all sessile, lanceolate to ovate-lanceolate, sharply serrate, those of the branches linear-lanceolate and entire; heads numerous, densely clustered in cymes. Dry soil; August-September; reported from Fayette and Story counties; probably common. (*K. eupatorioides corymbulosa* T. & G.)

LIATRIS Schreb. **BUTTON SNAKEROOT. BLAZING-STAR.** Perennials, from a roundish corm, erect, simple, leafy. Leaves long-linear, entire, rigid, sessile, or lower oblong-lanceolate or oblong-ovate, petioled. Heads discoid, few to many-flowered. Involucral scales well imbricated in many rows. Receptacle naked. Pappus of from 15-40 capillary bristles. Achenes slender, tapering, 10-ribbed.

* *Involucre cylindric or turbinate, 15-16-flowered.*

L. squarrosa (L.) Willd. Stem 1-3 feet high; frequently hairy; leaves rigid, long-linear; heads few, racemose, about an inch in length; involucral scales tapering to an acute point, leaf-like, spreading; corolla-lobes hairy inside, pappus plumose. Prairie soil; August-September; Scott, Wapello,

Decatur, Taylor, Page, and Cass counties; common in southern Iowa. (*Lacinaria squarrosa* (L.) Hill.)

L. cylindracea Mx. Stem 6-18 inches high; heads few, oblong-cylindrical, $\frac{1}{4}$ inch long; scales ovate, with appressed mucronate tips; pappus plumose; corolla-lobes hairy inside. Prairies; August-September; frequent, but apparently local; Fayette, Jones, Muscatine, and Story counties. (*Lacinaria cylindracea* (Mx.) Kuntze).

** *Involucre hemispheric; 15-45-flowered.*

L. scariosa (L.) Willd. Stem 3-5 feet high, scabrous-pubescent; leaves lanceolate, lower oblong-lanceolate and long-petioled; heads large, short, remotely racemose, few or many, 25-40-flowered; involucre hemispherical; scales obovate, obtuse, margins scarious, often colored; pappus barbellate. Prairie; August-September; common. (*Lacinaria scariosa* (L.) Hill.)

L. pycnostachya Mx. Stem 3-5 feet high, hairy or smoothish; upper leaves linear-lanceolate; heads small, many, few-flowered, in a dense spike, 6-20 inches long; scales oblong or lanceolate with recurved or spreading petal-like tips. Low prairies; August-September; common. (*Lacinaria pycnostachya* (Mx.) Kuntze).

L. punctata Hook. Stem 4-30 inches high, mostly glabrous; leaves narrowly linear, punctate, rigid; heads 3-6-flowered, usually many in a dense spike; scales oblong, acuminate, punctate; pappus very plumose; corolla-lobes naked. Dry sandy knolls; August-September; Fremont, Harrison, Woodbury, Lyon, Emmet, Hancock, and Dickinson counties. (*Lacinaria punctata* (Hook.) Kuntze).

GRINDELIA Willd. Coarse perennial glabrous herbs. Leaves alternate, sessile or clasping. Heads large, terminating the branches, radiate or discoid, many-flowered; rays pistillate. Involucral scales closely imbricated in several series, narrow-acuminate, green-tipped. Pappus of 2 or more awns. Achenes short, thick, glabrous.

G. squarrosa (Pursh) Dunal. Stem 1-3 feet high, leafy; leaves alternate, sessile, linear or spatulate-oblong, serrate; leaves and heads balsamic-viscid; rays pistillate, wanting in var. *NUDA* Gray. Waste places; August; infrequent; Woodbury, Sioux, Lyon, Ida, Palo Alto, Muscatine, Henry, Lee, Mahaska, Boone, and Fremont counties.

CHRYSSOPSIS Nutt. Perennials, with hairy stems, and large heads terminating the branches. Rays many, yellow, pistillate. Involucral scales linear, imbricated. Receptacle flat. Pappus double, outer of short rather chaffy bristles, inner of long capillary bristles. Achenes linear, flat, obovate or linear-oblong.

C. villosa (Pursh) Nutt. Stem about 1 foot high, hairy, corymbosely branched; leaves alternate, oblong-spatulate, entire, hairy. Dry soil; August; frequent; Lyon county.

APLOPAPPUS Cass. Mostly perennials. Leaves alternate. Involucre hemispherical, of many closely imbricated scales. Receptacle flat. Heads many-flowered, radiate; rays pistillate, yellow. Disk flowers yellow. Pappus of simple bristles. Achenes short, top-shaped or linear.

A. spinulosus DC. Perennial; stem 4-12 inches high, usually spreading; leaves pinnately or bi-pinnately parted, lobes bristle-tipped; achenes pubescent. Loess mounds, forming dense patches; April-September; Harrison, Monona, and Woodbury counties. (*Eriocarpum spinulosum* (Nutt.) Greene.)

SOLIDAGO L. **GOLDEN-ROD.** Perennials, with slender erect stems, nearly sessile, entire or serrate, alternate caudine leaves, and racemose or clustered, yellow, rarely white, heads. Involucral scales appressed, oblong, rarely with green tips. Receptacle small, not chaffy, alveolate, fimbriate in the last. Rays pistillate, few to many. Disk flowers perfect, yellow. Pappus simple, capillary, scabrous. Achenes teretish, ribbed. Flowers appear in August and September.

* *Inflorescence in the axils of feather-veined leaves.*

S. latifolia L. Stem 2-3 feet high, angular, ziz-zag, smooth or downy above; leaves broadly oval, thin, deeply serrate, acuminate, base tapering into a margined-petiole, pubescent beneath; flowers in short axillary clusters, the terminal racemose; scales appressed; rays 3-4. Rich woods; July-September; frequent; Allamakee, Fayette, Delaware, Jackson, Johnson, Henry, Des Moines, Story, Decatur, Winnebago, and Emmet counties. (*S. flexicaulis* L.)

S. bicolor L. Stem 1-2 feet high, simple, hairy; leaves elliptical to oblong, acute both ways, the lower slightly serrate, tapering into a petiole; flowers in small axillary clusters, rays 6-12, white; involucral scales obtuse. Woods; infrequent; Johnson and Winneshiek counties.

** *Inflorescence a terminal panicle.*

† *Leaves not triple-ribbed; racemes not secund.*

S. speciosa Nutt. Stem 3-6 feet high, simple, smooth; leaves thickish, the upper oval or oblong, smooth, rough-margined, lower ovate or broadly oval, sub-serrate, petioles margined; panicle ample, thyrsoid, rough-pubescent, scales oblong; rays 5-8. Upland borders; common in eastern Iowa, rarer westward.

S. rigidiuscula (T. & G.) Porter. Stem rather strict, 2-4 feet high, glabrous below, rough-pubescent above; leaves lanceolate or oblong-lanceolate, entire or the basal crenate, margins ciliolate, sessile or the lower petioled. Prairies; common throughout western Iowa, but the range is not well known as the species has been confused with the preceding. (*S. speciosa angustata* Gr.)

†† *Leaves not triple-ribbed; racemes secund.*

S. patula Muhl. Stem 4-5 feet high, smooth, angular-striate; leaves ample, ovate, acute, serrate, very rough above, smooth and veiny beneath; heads rather large, in short racemes, on spreading branches; scales obtuse. Swamps, Cedar river region; Muscatine county.

S. ulmifolia Muhl. Stem 2-4 feet high, glabrous; branches pubescent; leaves elliptic-ovate or oblong-lanceolate, tapering both ways, thin, veiny and soft-hairy beneath, sharply serrate or the upper entire; branches of the panicle long, slender, recurved; involucral scales lanceolate-oblong; ray and disk flowers 3-4. Woods; common; variable; Winneshiek, Jackson, Johnson, Henry, Des Moines, Decatur, and Taylor counties; reported from Fayette, Scott, and Story counties.

††† *Leaves more or less triple-ribbed; stem glabrous, panicle sometimes pubescent.*

S. missouriensis Nutt. Stem 2-3 feet high, simple, smooth throughout; leaves linear-lanceolate, tapering both ways, entire or sparingly denticulate, rough-margined, the lower frequently lanceolate, serrate; racemes short, dense; involucral scales obtuse, thick. Dry woods and prairies; common; flowering earlier than the other species; Muscatine, Johnson, Story, Decatur, Ringgold, Page, Fremont, Cerro Gordo, Dickinson, and Lyon counties; reported from Fayette, Monona, and Harrison counties.

S. serotina Ait. Stem 3-6 feet high, glabrous, often glaucous, branched above; leaves lanceolate; taper-pointed, sharply serrate above the tapering base, smooth on both sides, rough ciliate; panicle ample, pubescent: involucral scales linear, obtuse; rays long. The var. **GIGANTEA** Gray has the leaves more or less pubescent beneath. Open woods and borders; common; Winneshiek, Clayton, Dubuque, Muscatine, Johnson, Henry, Des Moines, Decatur, Taylor, Winnebago, Dickinson, and Emmet counties; reported from Fayette, Story, Hamilton, and Woodbury counties.

S. rupestris Raf. Stem slender, glabrous, 2-3 feet high; leaves thin, linear-lanceolate, tapering both ways, entire or sparingly serrate; heads small; rays short, 4-6. Loess mounds; Woodbury county, reported by Pammel, also reported from Scott county by Nagel and Haupt.

† † † Leaves more or less triple-ribbed; stem pubescent.

S. canadensis L. Stem 3-5 feet high, pubescent; leaves lanceolate, acuminate, sharply serrate or nearly entire, pubescent beneath, rough above; heads numerous, small; rays short. Borders and fields; common; varies greatly; Winneshiek, Clayton, Dubuque, Floyd, Delaware, Johnson, Henry, Decatur, Calhoun, Winnebago, and Emmet counties; reported from Fayette, Scott, Story, Hamilton, Dickinson, Monona, and Woodbury counties.

S. nemoralis L. Stem 6-24 inches high, cinereous-pubescent, simple or corymbed above; leaves spatulate or oblanceolate, entire or the lower somewhat serrate and tapering into a petiole; heads small, in numerous usually recurved racemes; involucral scales linear-oblong, appressed. Dry soil; common; Winneshiek, Dubuque, Floyd, Delaware, Johnson, Henry, Des Moines, Decatur, Story, Calhoun, Winnebago, Dickinson and Emmet counties; reported from Fayette and Hamilton counties.

* * * Heads in compound corymbs or in cymose clusters.

† Stem densely pubescent.

S. rigida L. Stem 2-4 feet high, stout, leafy, softly pubescent or glabrous; leaves oval or oblong, thick, rigid, entire or obscurely serrate, feather-veined; lower leaves oblanceolate, tapering into slender petioles; heads numerous, large, many-flowered; involucral scales very obtuse; rays 7-10. Prairies; common; Winneshiek, Floyd, Johnson, Decatur, Fremont, Jasper, Winnebago, Emmet, and Lyon counties; reported from Fayette, Scott, Story, Hamilton, Monona, and Woodbury counties.

† † Stem glabrous or nearly so.

S. riddellii Frank. Stem 1-3 feet high, glabrous, stout; leaves long and narrow, entire, from a sheathing base, mostly recurved, radical leaves very long, tapering into long petioles; heads numerous, many-flowered, in a dense corymb, the branches and pedicels rough-pubescent; rays 5-7. Low prairies, sloughs, often growing in water; infrequent; Muscatine, Floyd, Hancock, and Emmet counties; reported from Story and Hamilton counties.

S. lanceolata L. Stem from a long and slender rootstock; 1-3 feet high, much branched, usually smooth; leaves narrowly lanceolate, sessile, 3-nerved, heads small, in sessile glomerate clusters disposed in flat-topped corymbs; rays small, 15-20; late flowering. Sandy or wet soil, pastures and copses common; Johnson, Henry, Decatur, Dickinson, and Emmet counties; reported from Fayette, Scott, and Story counties. (*Euthamia graminifolia* (L.) Nutt.)

BOLTONIA L'Her. Bushy-branched glabrous perennials, with striate angled stems, entire leaves, and Aster-like flowers. Heads many-flowered, radiate; rays many, pistillate. Scales in two series, appressed, with scarious

margins. Receptacle convex, punctate. Pappus of minute bristles and often 2-3 awns. Achenes flat, obovate, 2-3-winged.

B. asteroides (L.) L'Her. Stem 1-6 feet high; leaves long-lanceolate, entire; involucral scales acuminate. Moist soil, sloughs and low places; July-September; frequent; Muscatine, Johnson, Henry, Lee, Decatur, Ringgold, Taylor, Winnebago, and Emmet counties; reported from Story, Harrison, Monroe, and Woodbury counties.

ASTER, L. ASTER. Perennials, with alternate leaves, and panicled, corymbed, or racemose heads. Disk-flowers perfect, yellow to purplish; rays pistillate, 3-toothed at the apex; white, blue, or purple, never yellow. Involucral scales loose, imbricated, often with green tips. Pappus simple, or double in the last, capillary. Receptacle flat, alveolate. Achenes compressed. Common in late summer and autumn.

A. Pappus simple, of capillary bristles.

* *Lower and basal leaves cordate and slender-petioled, the stem leaves not cordate-clasping.*

† *Rays white, violet, or rose.*

A. corymbosus Ait. Stem 1-2 feet high, nearly smooth, somewhat flexuous; leaves ample, ovate, acuminate, thin, coarsely serrate, all but the uppermost with a heart-shaped base, and on long, wingless petioles; heads oblong, in small open corymbs; rays 6-9, white. Rich woods; Muscatine county. (*A. divaricatus* L.)

A. macrophyllus L. Stem 2-3 feet high, rigid, rough-pubescent; leaves thickish, rough, serrate, pubescent beneath, the upper ovate or oblong, sessile or on margined petioles, the lower cordate and long-petioled; heads one-half inch high, larger than the preceding; scales obtuse, the inner longer and thinner. Hilly woodlands, not rare; Muscatine county.

†† *Rays blue or purple, rarely white.*

‡ *Leaves entire or nearly so, firm, or thick.*

A. azureus Lindl. Stem 1-3 feet high, rigid, roughish, paniculately branched; leaves rough, the radical and lower caulin leaves lanceolate, more or less with cordate bases, on long petioles, the upper lanceolate to linear or subulate, wing-petioled or with attenuated base to sessile; rays violet blue; involucre obconic; scales with abrupt green tips, appressed. Prairies and thickets; frequent; Johnson, Story, Des Moines, Appanoose, and Decatur counties.

A. shortii Hook. Stem 2-4 feet high, rough-pubescent; leaves lanceolate or ovate-lanceolate, long-acuminate, entire, on slender naked petioles, base deeply cordate, smooth above, minutely pubescent beneath, the upper leaves sessile; racemes paniculate; involucre campanulate; scales with green tips. Cliffs and banks; infrequent; Winneshiek, Muscatine, Johnson, and Lee counties, reported from Fayette county.

‡‡ *Leaves mostly sharply serrate, thin.*

A. cordifolius L. Stem 1-3 feet high, smooth or slightly pubescent, rarely hairy, paniculately branched above; leaves ovate-cordate, sharply serrate, on long slightly margined petioles, or upper lanceolate and sessile; heads panicled; rays pale blue or white; involucre obconic, scales appressed, tipped with short green points. Woods; common; Winneshiek, Johnson, and Decatur counties, reported from Fayette, Story, and Des Moines counties.

A. sagittifolius Willd. Stem 2-4 feet high, rigid; leaves ovate-lanceolate, pointed, serrate, pubescent beneath, the lower with the base truncate or cor-

date and wing-petioled, the upper linear or lanceolate, sessile; heads raceme, scales loose, linear-subulate. Woods; common; Fayette, Des. ware, and Johnson counties; reported from Winneshiek, Allamakee, Clayton, Dubuque, Des Moines, Henry, Plymouth, and Monona counties.

A. drummondii Lindl. Stem stout, 2-4 feet high, pale, grayish pubescent; leaves ovate or ovate-lanceolate, acuminate, rough above, canescent beneath the lower and basal cordate, with slender naked petioles, the upper with cordate or rounded bases and marginated petioles, those of the branches sessile. Dry soil, open woods; infrequent; Winneshiek, Delaware, Muscatine, Henry, Des Moines, Johnson, Jasper, Winnebago and Dickinson counties, reported from Story and Floyd counties.

* * Leaves not cordate or petioled, some or all of the caulinne with cordate or auriculate clasping bases.

† Stem rough, or hirsute-pubescent.

‡ Leaves entire, oblong, linear, or lanceolate.

§ Leaves sessile, strongly cordate-clasping.

A. patens Ait. Stem 2-4 feet high, rough-pubescent, loosely paniculate above; leaves ovate-oblong to oblong-lanceolate, cordate-clasping; heads large, terminal; rays many, violet-blue; scales slender, tips acute, spreading. Forms from Delaware county have been referred to this species.

A. phlogifolius Muhl. Stem 2-4 feet high, rough-pubescent; leaves lanceolate to oblong-lanceolate, entire, acuminate, auriculate-clasping, much contracted below the middle, thin, rough above, pubescent beneath; rays many, purple blue. Woods; Winnebago county. (*A. patens* var. *phlogifolius* Nees.)

A. novae-angliae L. Stem 3-7 feet high, stout, hairy, leafy, corymbosely branched; leaves lanceolate, auriculate-clasping, entire, acute; rays many, violet-purple, rarely varying to rose-purple, or white; scales nearly equal, green throughout, narrowly linear. Sloughs and low places; common; Winneshiek, Floyd, Delaware, Johnson, Jefferson, Des Moines, Appanoose, Decatur, Story, Winnebago, Lyon, and Emmet counties; reported from Fayette and Monona counties.

§ § Leaves slightly cordate clasping.

A. oblongifolius Nutt. Stem 1-2 feet high, much branched, hirsute-pubescent, leafy; leaves narrowly oblong to oblong-lanceolate, entire, clasping, rough or hispidulous on both sides, rough-margined; rays violet purple; involucre hemispheric, the bracts glandular. Prairies and rocky bluffs; infrequent; Fayette, Muscatine, Des Moines, Johnson, Pottawattamie, Calhoun, and Lyon counties; reported from Story, Monona, and Woodbury counties.

A. amethystinus Nutt. Resembles the preceding, stem taller, 2-5 feet high, hoary puberulent or somewhat hirsute; leaves linear-lanceolate, rough on both sides, partly clasping; involucral scales erect, the green tips merely spreading, involucre turbinate, the bracts hispid. Moist places, scarce; reported from Floyd and Story counties.

† ‡ The lower and most of the upper leaves serrate.

A. puniceus L. Stem stout, 3-6 feet high, hispid; leaves oblong-lanceolate, auriculate-clasping, acuminate, coarsely serrate to sparingly denticulate or sometimes entire; heads rather large, sparsely paniculate or thyrsoid-crowded; involucre of loose, thin, equal, linear scales, arranged in two rows; rays $\frac{1}{2}$ inch long, showy, violet, varying to purple or white. Swampy grounds; frequent; Fayette, and Muscatine counties, reported from Story county.

† † Stem glabrous or sparingly pubescent ab'ne.

† Leaf sharply serrate, sometimes ^{entire} in *A. laevis*.

A. prenanthoides Muhl. Stem 1-3 feet high, slender, nearly glabrous or hairy above; leaves thin, ovate-lanceolate, taper-pointed, sharply serrate in the middle, tapering into a slender, elongated, entire portion towards the base, upper surface rough, lower smooth, base auriculate-clasping; heads about $\frac{1}{2}$ inch high, on short divergent peduncles, involucral scales narrow, somewhat spreading; rays light blue or whitish. Rich woods; frequent; Jackson, Delaware, Muscatine, and Johnson counties, reported from Fayette and Story counties.

A. laevis L. Stem 2-4 feet high, smooth, often glaucous; leaves lanceolate or oblong-lanceolate, entire or sub-serrate, thickish, radical and lower leaves large, wing-petioled, the upper partly clasping by an auriculate base; heads chiefly solitary on the branchlets; involucre hemispherical, scales with broad, acute, appressed, green tips. Prairies and rocky woods; frequent and widely distributed; Winneshiek, Fayette, Floyd, Delaware, Johnson, Henry, Decatur, Winnebago, Lyon, Dickinson, and Emmet counties, reported from Story and Hamilton counties.

† † Leaves entire or nearly so.

A. longifolius Lam. Stem 1-3 feet high, glabrous or somewhat pubescent, branched; leaves long-lanceolate to linear-lanceolate, entire or nearly so, acuminate, base sessile, clasping; heads numerous, about an inch broad, the scales narrow, green, acute, in 1 or 2 rows. Moist soil; specimens from Delaware and Henry counties referred to this species.

* * * Leaves petioled or sessile, not clasping or scarcely so.

† Leaves entire, silvery, silky or canescent or both sides.

A. sericeus Vent. Stem 1-3 feet high, smooth, very rigid, branched; leaves lanceolate or oblong, sessile, entire, silvery white on both sides; heads large, mostly terminal, on slender branches; rays many, violet-purple; scales leaf-like, tips spreading. Common on the prairies in western and southern Iowa, infrequent eastward; Winneshiek, Delaware, Muscatine, Johnson, Decatur, Ringgold, Taylor, Page, Fremont, Montgomery, Pottawattamie, Winnebago, Lyon, and Emmet counties; reported from Fayette, Story, Buena Vista, Monona, Harrison, and Woodbury counties.

† † Leaves often toothed, neither silvery, silky nor canescent.

† Heads corymbose.

A. ptarmicoides (Nees) T. & G. Stems simple, tufted, 8-20 inches high, smooth or sparingly pubescent; leaves linear-lanceolate, 1-3-nerved, acute, entire, rough-margined, lower tapering to a short petiole; heads in a flat corymb; involucral scales imbricated in 3 or 4 rows, appressed, without green tips; rays white. Sandy soil; Muscatine, Emmet, and Lyon counties.

† † Heads solitary at the ends of the branchlets.

A. dumosus L. Stem 1-3 feet high, glabrous, paniculately branched; leaves linear or linear-lanceolate, entire, acute or obtusish, rough-margined, those of the branches small and bract-like; heads many, terminating the branches and branchlets; involucre campanulate, the scales in 4 rows, linear-subulate, obtuse or acutish, appressed, green-tipped; rays 15-30, white to pale violet. Sandy soil; reported from Benton county by Arthur; specimens from Lee county have been referred to this species.

† † † Heads paniculate, not in 1-sided racemes.

A. salicifolius Lam. Stem 2-5 feet high, slender, paniculately branched, leafy, glabrous or slightly pubescent above; leaves lanceolate or linear-lan-

ceolate, sparingly dentate or entire; rough-margined, acute or acuminate, sessile or somewhat clasping, the lowest sometimes petioled; heads numerous, rather large; involucle turbinate, its bracts linear-oblong, green-tipped, acute or obtusish, appressed, in 4 or 5 series; rays many, violet, purplish, or white. Low moist soil; common; Johnson, Henry, and Decatur counties.

A. paniculatus Lam. Stem 2-8 feet high, glabrous, paniculately branched; leaves lanceolate or oblong-lanceolate, acuminate, base narrowed and sessile or clasping, sparingly serrate to nearly entire; heads many, rather broad; involucle hemispheric, the bracts linear-lanceolate, acute or acuminate, appressed, green-tipped, in 4 or 5 rows; rays many, white or purplish. Moist soil; Fayette county, reported from Story, Woodbury, Lyon, Lee, and Henry counties.

A. tradescanti L. Stem 2-5 feet high, slender, paniculately branched, branches ascending and sometimes pubescent in lines; caudine leaves lanceolate or linear-lanceolate, acuminate, narrowed to the sessile base, entire or more commonly sharply serrate in the middle; heads numerous, racemose; involucle hemispheric to broadly turbinate, its bracts linear, acute, green-tipped, appressed, in 4 or 5 rows; rays white or whitish, short and narrow. Fields and low places; specimens from Delaware and Johnson county have been referred to this species.

A. ericoides L. Stem 1-3 feet high, bushy, paniculately branched, glabrous; leaves firm or rigid, the basal spatulate, obtuse, dentate, with marginated-petioles; caudine leaves linear, entire, acute, the uppermost linear-subulate; heads many; involucle hemispheric to campanulate, the bracts green-tipped, linear-lanceolate or lanceolate, in about 3 rows; rays 15-25, white or rosy tinged. Dry soil; Henry county, reported from Lee and Monona counties.

† † † Heads racemose and usually 1-sided on the branches.

A. diffusus Ait. Stem 1-4 feet high, much branched, pubescent or nearly glabrous; leaves lanceolate or oblong-lanceolate, tapering both ways, sharply serrate in the middle or the smaller entire, sessile, thinish; heads disposed singly or in clusters along the flowering branches; rays short, white or sometimes purplish; involucral scales linear, obtuse or acutish. Low woods; common; Story, Fayette, Delaware, Johnson, Henry, Appanoose, and Decatur counties. (*A. lateriflorus* (L.) Britton).

A. multiflorus Ait. Stem about a foot high, bushy-branched, grayish, pubescent; leaves small, linear, entire, sessile or partly clasping; heads small, crowded in numerous racemes; herbaceous tips of the involucral scales spreading; rays white, rarely bluish. Sandy soil, woods and prairies; common; Winneshiek, Fayette, Floyd, Delaware, Scott, Muscatine, Des Moines, Henry, Jefferson, Johnson, Story, Hamilton, Appanoose, Decatur, Ringgold, Taylor, Harrison, Woodbury, and Emmet counties.

B. Leaves petioled or sessile, entire; pappus double, the inner bristles long, the outer shorter.

A. umbellatus Mill. Stem 2-8 feet high, glabrous or pubescent above, striate, corymbosely branched; leaves lanceolate to oblong-lanceolate, taper pointed, base narrowed into short petioles, upper sessile, usually pubescent on the veins beneath, entire, margin hispid; heads many, in compound flat corymbs; involucle campanulate or hemispheric, the scales acutish or obtusish, in 3 or 4 rows. Low grounds; Johnson and Story counties, reported from

Fayette county. (*Dwellingeria umbellata* (Mill.) Nees.) The variety *PUBENS* Gray has the lower surfaces of the leaves pubescent and is reported from Story county. (*D. umbellata pubens* (Gray) Britton).

ERIGERON L. **FLEABANE.** Herbs, with alternate simple leaves, and solitary or corymbose pedunculate heads. Ray-flowers many, pistillate, white or purple; disk-flowers yellow. Involucral scales narrow, equal, scarcely imbricated. Receptacle flat or convex. Pappus of capillary bristles, mostly simple. Achenes compressed, 2-nerved, frequently pubescent.

* *Heads small, rays short, inconspicuous, in several rows.*

E. canadensis L. *Horse-weed.* Stem 1-5 feet high, erect, hairy; leaves linear to linear-lanceolate, usually entire, radical cut-lobed; heads small, numerous, paniculate; rays short, white. Waste places; July-October; common. (*Leptilon canadense* (L.) Britton).

E. divaricatus Mx. Stems low, 3-15 inches high, diffuse and decumbent, hairy; leaves linear, entire; heads small, corymbose; rays purple. Prairie or open woods; June-August; common; Emmet, Story, Johnson, Muscatine, Appanoose, Decatur, Ringgold, and Fremont counties. (*L. divaricatum* (Mx.) Raf.)

* * *Heads larger, rays elongated, conspicuous, in one or more rows.*

E. annuus (L.) Pers. *Daisy Fleabane.* Stem 2-4 feet high, branching, hirsute; leaves ovate to lanceolate, sessile or lower on margined petioles, coarsely and sharply toothed; rays numerous, purplish. Fields and waste places; June-August; common.

E. strigosus Muhl. *Daisy Fleabane.* Stem 2-3 feet high, branched, appressed pubescent or nearly smooth; upper leaves lanceolate, lower oblong or spatulate, 3-nerved, tapering into a petiole, all mostly entire; rays white. Fields; June-August; common. (*E. ramosus* (Walt.) B. S. P.)

E. philadelphicus L. *Common Fleabane.* Stem about 2 feet high, hairy; leaves clasping by a heart-shaped base, ovate, or lower spatulate, entire or remotely toothed, thin; heads few, corymbed; rays rose-purple. Upland woods; May-July; common.

E. bellidifolius Muhl. *Robin's Plantain.* Stem 1-2 feet high, hairy, simple; radical leaves obovate or spatulate, sparingly toothed, stem leaves remote, lance-oblong, clasping, entire; heads few, large, on slender peduncles; rays 50 or more, linear-spatulate, rather broad, purple. Woods; May-June; infrequent. Winneshiek, Fayette, Muscatine, Delaware, Johnson, Henry and Jackson counties. (*E. pulchellus* Mx.)

ANTENNARIA Gaertn. Perennial white-woolly herbs, with alternate entire leaves, and corymbed heads of dioecious or polygamodioecious flowers. Heads many-flowered, discoid. Scales of the involucre imbricated, white or colored, dry and scariosus. Receptacle sub-convex, foveolate, not chaffy. Pappus a single row of bristles, in the pistillate flowers capillary and united at the base, in the staminate flowers thickened and barbellate above. Fertile corollas slender. Achenes terete or flattish.

A. plantaginifolia (L.) Richards. Stem 4-18 inches high, simple, with running stolons, forming patches, radical leaves spatulate to obovate or oval, 3-nerved, petioled, caudine leaves sessile, oblong or lanceolate to linear, the upper small, bract-like; heads in a close terminal corymb. Fields and upland woods; April-May; common.

ANAPHALIS DC. White-woolly perennials, with many of the characters of the preceding genus. Flowers dioecious, usually the pistillate heads with a few perfect but sterile flowers in the center. Pappus in the pistillate flowers

not united at the base, of copious capillary bristles, in the staminate flowers not thickened above.

A. margaritacea (L.) Benth. & Hook. Stem 1-2 feet high, simple, corymbosely branched above, leafy; leaves nearly linear to broadly lanceolate, acuminate, entire, sessile, becoming green above, the larger obscurely 3-nerved; involucral scales pearly-white, numerous, unequal, imbricated, obtuse. Fields and open woods; July-August; frequent; Delaware, Johnson, and Decatur counties; perhaps generally distributed. This species is confused with the following, the general appearance of which it resembles.

GNAPHALIUM L. Woolly or pubescent herbs, with sessile alternate leaves, and variously clustered heads of fertile flowers. The pistillate flowers in several series, the perfect flowers central, few. Pappus of capillary bristles.

G. polyccephalum Mx. Annual or winter-annual; stem 1-3 feet high, woolly or tomentose; leaves lanceolate or linear-lanceolate, sessile, glabrate above, white-woolly beneath, margins undulate; heads in corymbose or paniculate clusters; pappus-bristles distinct. This species is frequently reported. (*G. obtusifolium* L.)

INULA L. Coarse perennials, with alternate simple leaves, and large many-flowered heads. Rays pistillate, yellow. Disk flowers perfect, yellow. Involucre hemispherical, of imbricated foliaceous scales. Receptacle naked. Pappus simple, of capillary bristles. Anthers sagittate at the base, the auriacles caudate. Achenes somewhat 4 or 5-ribbed.

I. helenium L. Elecampane. Stem 2-6 feet high, from a large thick root; leaves large, oblong or ovate, woolly beneath, entire or dentate, radical petioled, caudate clasping; scales ovate. Open woods; July-August; local; Johnson county; rarely in waste places. Decatur county.

POLYMNIA L. Perennial branching herbs, with opposite or alternate thin lobed leaves, and light yellow flowers. Heads radiate, many-flowered; rays few, pistillate; disk flowers perfect but sterile. Involucral scales in two rows; outer about 5, leaf-like, spreading; inner smaller, membranaceous. Receptacle flat, chaffy. Pappus wanting.

P. canadensis L. Stem 2-5 feet high, clammy-hairy; leaves petioled, the lower pinnatifid, the upper deltoid-ovate or hastate, 3-5-lobed or entire; rays 5, in the typical form shorter than the involucre, often minute or abortive; achenes 3-ribbed. The form represented in our flora is variety *RADIATA* Gray, which has the rays longer and 3-lobed. Wooded ravines; June-July; frequent; Winneshiek, Allamakee, Clayton, Dubuque, Fayette, Muscatine, and Des Moines counties.

SILPHIUM L. ROsin-WEED. Coarse perennials, with alternate or opposite leaves, resinous juice, and large yellow-flowered heads. Ray-flowers many, pistillate, fertile, in 2 or 3 rows, outer ligulate; disk-flowers perfect, sterile; style entire. Involucral scales foliaceous, spreading, in several rows. Receptacle flat, chaffy. Pappus wanting or of 2 teeth. Achenes broad, flat, dorsally compressed.

* *Stems terete; leaves alternate.*

S. laciniatum L. Compass-plant. Whole plant covered with whitish hairs; stem 3-10 feet high, terete, simple; leaves alternate, pinnately parted; divisions linear, cut, sinuate-lobed or entire; petioles dilated at their bases; radical or lower leaves 1-2 feet long; heads large, several, sessile or short peduncled, mostly alternately arranged along the upper part of the naked

stem; scales ovate, tapering into long and spreading points; achenes broadly winged. Prairies; July; frequent throughout the state.

S. terebinthinaceum Jacq. Stem 4-10 feet high, branched, scaly, glabrous or nearly so; leaves basal, large, ovate, long-petioled, apex acute, base cordate, both sides rough, sharply dentate; heads many; achenes obovate, narrowly winged. Prairies and dry woods; reported from Iowa.

* * *Stems square; leaves or their petiole-bases connate-perfoliate.*

S. perfoliatum L. *Cup-plant.* Stem square, 4-7 feet high, often branched above; leaves large, thin, ovate, rough, remotely-toothed, opposite or in 3's, their bases connate, forming a cup around the stem; lower leaves wing-petioled; bases of petioles dilated and connate; heads corymbose, on long peduncles; scales ovate, achenes winged. Moist soil; July-August; frequent throughout the state.

* * * *Stems terete or slightly 4-angled; leaves opposite or whorled.*

S. integrifolium Mx. Stem 4-angled and grooved, 2-4 feet high, smooth or pubescent; leaves opposite or uppermost alternate, ovate-lanceolate, rough-pubescent or smooth, entire; rigid, sessile, bases cordate, partly clasping; heads short-peduncled, in a close corymb; achenes broadly winged. Prairies, roadsides, and open woods. July-August; frequent throughout the state.

S. trifoliatum L. Stem 4-7 feet high, glabrous, sometimes glaucous; leaves lanceolate or oblong-lanceolate, the middle ones in whorls of 3 or 4, the uppermost opposite, acuminate, narrowed at the base, rough above, glabrate beneath, short-petioled, entire or somewhat denticulate; heads several or many; achenes rather broadly winged. Woods; reported from Winnebago and Clinton counties.

PARTHENIUM L. Perennials, with alternate leaves, and corymbose heads. Rays 5; ligules white, short, obovate, fertile; disk-flowers many, sterile. Involucre hemispherical; scales in 2 series, ovate or roundish. Receptacle conical; chaffy. Achenes compressed, crowned with 2 teeth and the remains of the corolla.

P. integrifolium L. *Prairie Dock.* Stem 1-4 feet high, rough-pubescent, mostly simple; radical or lower leaves long-petioled, ample, ovate, crenate-toothed, coriaceous, upper sessile; heads many. Upland soil; June-September; frequent; more common in the eastern and southern counties; Winnesheik, Allamakee, Fayette, Dubuque, Muscatine, Johnson, Henry, Appanoose, Decatur, Ringgold, and Fremont counties.

ECLIPTA L. A rough annual, with opposite leaves, and small solitary many-flowered heads. Rays short, white, numerous, fertile; disk-flowers perfect, 4-toothed, fertile. Involucral scales in 2 rows, ovate-lanceolate, foliaceous. Receptacle flat, with bristle-like chaff. Pappus wanting or of 2-4 teeth or short awns. Achenes thick, in the rays mostly 3-sided, in the disk-flowers compressed, more or less margined.

E. alba L. Hasskarl. Stem procumbent or ascending, 1-3 feet high, appressed-pubescent; leaves mostly sessile, lanceolate or oblong, tapering both ways, sparingly serrate; rays scarcely exceeding the disk. River banks; July-August; infrequent; Johnson, Linn, Muscatine, and Lee counties.

HELIOPSIS Pers. Perennials, with opposite petioled 3-nerved leaves, and yellow flowers. Involucre short, of 2 or 3 rows of imbricated subequal scales. Rays 10 or more, fertile. Receptacle conical, with linear chaff. Pappus coriiform; of 2-3 teeth, or wanting. Achenes truncate; smooth, 4-sided.

H. scabra Dunal. *Rough Ox-eye.* Stem 2-4 feet high, somewhat pubescent

scabrous; leaves broadly ovate to ovate-lanceolate, scabrous, serrate; rays oblong or linear, 2-3-toothed; achenes pubescent on the angles when young. Prairies and open woods; June-September; frequent throughout the state.

H. laevis Pers. Similar to the preceding; stem 3-5 feet high, glabrous leaves opposite, sometimes in 3's; ovate or ovate-lanceolate, rather thin, acuminate, sharply dentate, smooth on both sides or roughish above; achenes glabrous, truncate. Woods; July-September; infrequent; Muscatine, Decatur, and Fremont counties. (*H. helianthoides* (L.) B. S. P.)

ECHINACEA Moench. Perennials, with mostly alternate 3-5-nerved leaves, and single terminal large heads. Involucral scales in 2 or 3 rows, imbricated, lanceolate, spreading. Receptacle conical, bristling with spiny-tipped chaff. Rays rose-purple, long, drooping, pistillate but sterile. Disk-flowers purplish, shorter than the chaff. Pappus a few teeth. Achenes thick, short, 4-sided.

E. angustifolia DC. *Pale Purple Cone-flower*. Stem 1-3 feet high, bristly-hairy, simple; leaves lanceolate or linear-lanceolate, entire, tapering both ways, long-petioled, bristly-hairy; rays 12-15, 2-3-toothed, 1-2 inches long. Prairies; June-September; common. (*Brauneria pallida* (Nutt.) Britton).

E. purpurea Moench. *Purple Cone-flower*. Stem 2-4 feet high, rough-hairy to nearly smooth; lower leaves long-petioled, ovate, 5-nerved, upper usually 3-nerved, all rough and frequently serrate; involucral-scales in 3-5 rows, lanceolate; rays 15-20, dull purple, bifid, 1-2 inches long. Woods; July-August; infrequent; Appanoose, Decatur, and Louisa counties. (*B. purpurea* (L.) Britton).

RUDBECKIA L. Biennials or perennials, with alternate leaves, and terminal showy many-flowered heads. Involucral scales about 12, in 2 rows, foliaceous. Receptacle conical or columnar, chaffy. Rays many, neutral, mostly yellow. Disk-flowers perfect. Pappus a toothed or cut margin, or wanting. Achenes 4-angled.

R. triloba L. *Brown-eyed Susan*. Biennial; stem 2-5 feet high, with slender spreading branches; lower leaves 3-lobed or 3-parted, serrate; upper ovate-lanceolate, serrate, acuminate, subsessile; heads small; disk conical, dark purple; chaff awned, rays about 8, oval or oblong. Woods; August-September; common.

R. subtomentosa Pursh. Stem 3-4 feet high, branching, downy, and scabrous; leaves mostly 3-lobed or 3-parted, downy, divisions ovate or ovate-lanceolate, serrate; heads corymbose, short-peduncled; disk globular, dull brown; chaff obtuse, bearded. Prairies and open woods; August-September; frequent; Muscatine, Johnson, and Decatur counties; reported from Fayette and Story counties.

R. hirta L. *Black-eyed Susan*. Biennial, bristly-hairy throughout; stem 1-2 feet high, mostly simple; upper leaves oblong or lanceolate, mostly entire, sessile, lower long-petioled, spatulate, 3-nerved; rays 9-14; disk dull brown; chaff hairy at the apex. Woods and prairies; June-August; common.

R. laciniata L. Stem glabrous, 2-7 feet high; lower leaves 3-lobed or 5-parted, divisions usually cut or lobed, ovate-lanceolate, acuminate; heads on long slender peduncles; disk globular in flower, columnar in fruit; rays oblique-lanceolate, drooping. Low grounds; August; common.

LEPACHYS Raf. Perennial herbs, with alternate pinnately divided leaves, grooved stems, and terminal heads. Involucral scales linear, in one row. Receptacle oblong or columnar, chaffy. Rays few, neutral, yellow. Disk-flowers perfect. Pappus of 2 teeth or wanting. Achenes compressed, 1-2-winged.

L. pinnata T. & G. Stems 2-4 feet high, stigose-pubescent, slender, branched above; leaflets 3-7, narrowly lanceolate, entire or remotely serrate; disk ovoid; rays about 2 inches long, light yellow, drooping; achenes obscurely 2-tipped. Prairies; July-August; frequent and widely distributed. (*Ratibida pinnata* (Vent.) Barnhart.)

L. columnaris T. & G. Stem 1-2 feet high, strigose-pubescent and scabrous, branched; leaflets 5-9, oblong to linear, entire or 2-3-cleft, heads on long peduncles; disk columnar, 1-2 inches long; rays usually shorter, ovate, yellow. Prairies; August; rare; Henry, Page, Boone, and Lyon counties. (*R. columnaris* (Sims) D. Don).

HELIANTHUS L. SUNFLOWER. Annual or perennial herbs, with alternate or opposite leaves, and solitary or corymbed pedunculate heads which terminate the stem or branches. Involucre imbricated, leaf-like. Receptacle plane or convex, with persistent chaff which embraces the achenes. Rays few to many, neutral, yellow. Pappus of 2 or 4 chaffy scales, mostly deciduous. Achenes compressed or 4-angled.

* Disk purple, purplish or brown; receptacle flat or conic.

† Ours annuals; leaves mostly alternate, the lower opposite.

H. annuus L. Common Sunflower. Stem 2-10 feet high, usually much branched, hispid or scabrous; leaves mostly alternate, petioled, ovate or lower cordate, 3-nerved, serrate; involucral scales ovate or oblong, long-acuminate, ciliate; disk 1 inch or more across. Commonly cultivated and a common escape in waste places; infrequent in the wild state; July-September.

H. petiolaris Nutt. Stem simple or branched, 1-3 feet high, strigose-hispidulous; leaves ovate-lanceolate or oblong, slender-petioled, usually entire; involucral scales lanceolate or oblong-lanceolate, sometimes ciliate; tips mucronate or attenuate; disk about half an inch broad. Dry soil; July-August; rare; Dubuque and Muscatine counties.

†† Perennial; leaves mostly opposite, the upper alternate.

H. rigidus Desf. Stem 2-4 feet high, simple, sometimes branched, rigid, rough; leaves opposite, 3-nerved, nearly sessile, oblong-lanceolate or lower oval, entire or somewhat serrate, rigid, rough on both sides, tapering both ways; heads large, usually solitary, terminal; scales ovate or oblong, acute, or obtuse, ciliate, appressed; rays 15-25; disk dark. Prairies; August-September; frequent; Floyd, Hancock, Johnson, Winnebago, Decatur, Ringgold, Taylor, Page, and Fremont counties; reported from Fayette, Scott, Louisa, Story, Woodbury, Sioux, Lyon, Dickinson, and Emmet counties. (*H. scaberrimus* Ell.)

** Disk yellow or yellowish; receptacle conic or convex; perennial.

† Leaves usually lanceolate, much longer than wide.

‡ Leaves mostly basal, the upper bract-like.

H. occidentalis Riddell. Stem 2-3 feet high, somewhat hairy with runners from the base, simple, nearly leafless above; leaves oval, 3-nerved, lower on long hairy petioles, the upper small, nearly sessile and remote; heads small, 1-5, on long peduncles; scales lance-ovate, acute, often ciliate; disk yellow. Prairies; August-September; frequent; Winneshiek, Johnson, and Lee counties; reported from Clinton, Benton, Fayette, Henry, and Muscatine counties.

‡‡ Leaves mostly caudine and alternate or opposite.

§ Stem scabrous, scabrate or hispid; leaves sessile or nearly so.

H. giganteus L. Roots fleshy, rootstock creeping; stems hispid or scabrous, 3-10 feet high, simple or branched above; leaves sessile or short-petioled, lanceolate, scabrous above, hirsute beneath, denticulate or serrate, mostly alternate but sometimes opposite; heads several, long-peduncled; involucre hemispheric, the bracts lanceolate-subulate, ciliate or hirsute, squarrose. Reported as rare from Fayette county.

H. maximiliana Schrad. Stem 2-8 feet high, stout, hispidulous-scabrous; leaves alternate, some opposite, narrowly lanceolate, tapering both ways, sub sessile, entire or nearly so, very scabrous on both sides; heads over medium size, terminating the stem or branches; scales long-attenuate; rays golden yellow. Prairies; August-September; infrequent; Emmet and Dubuque counties, reported from Floyd, Story, Buena Vista, Monona, Woodbury, Sioux, Lyon, and Dickinson counties.

‡ ‡ *Stem glabrous, glaucous, leaves petioled.*

H. grosse-serratus Martens. Stem smooth, glaucous, 3-8 feet high, mostly simple; leaves opposite; petioled, long-lanceolate, long-pointed, sharply serrulate or denticulate, whiter and pubescent beneath; scales subulate; heads many, small, short-peduncled; rays 15-20. Low grounds; August-September; common.

† † *Leaves ovate, ovate-lanceolate, or oblong.*

‡ *Leaves sessile, or nearly so.*

H. mollis Lam. Stem 2-3 feet high, simple, hirsute; leaves ovate to lanceolate, acute or acuminate, 3-nerved, base cordate-clasping; heads few or solitary; involucre hemispheric, the bracts lanceolate, acuminate, villous-canescens, slightly spreading. Dry soil; August-September; reported as belonging to the flora of Iowa.

H. divaricatus L. Stem 2-7 feet high, glabrous or pubescent above; leaves usually opposite, divaricate, lanceolate or ovate-lanceolate, dentate or denticulate, rough above, pubescent beneath, apex long-acuminate, base truncate; scales narrowly lanceolate, hirsute or ciliate. Dry woodlands; July-September; specimens from Winneshiek, Fayette, and Henry counties have been referred to this species.

‡ ‡ *Leaves petioled.*

‡ *Stems glabrous or puberulent.*

H. decapetalus L. Stem 1-3 feet high, slender, glabrous or nearly so, branches puberulent; leaves thin, ovate or ovate-lanceolate, sharply serrate, roughish above, more or less finely pubescent beneath, the lower opposite, slender petioled, the upper alternate, apex acuminate, base rounded or truncate and decurrent on the petiole; scales linear-lanceolate, acuminate, hirsute, ciliate, spreading. Moist woods; August-September; specimens from Floyd county have been referred to this species.

H. tracheliiifolius Mill. Stem 3-6 feet high, roughish-pubescent; leaves ovate-lanceolate, short-petioled, 3-nerved at the base, green on both sides, rougher above, lower sharply serrate; scales linear-lanceolate, long-acuminate, puberulent, ciliate, larger than the disk, sometimes foliaceous. Borders; August-September; infrequent. Specimens from Fayette, Johnson, and Story counties are referred to this species.

H. strumosus L. Rootstock long and slender; stem 3-6 feet high, usually branching, smooth, often glaucous, the branches rarely hispidulous; leaves ovate-lanceolate, acuminate, abruptly contracted or tapering into margined petioles, entire or slightly serrate, rough above, whiter and often

downy beneath; scales ovate-lanceolate, acuminate or attenuate and spreading, ciliate. Borders of woods, August-September; common. The variety *MOLLIS* T. & G., has the leaves finely and densely canescent beneath and is reported from Story county. (*H. strumosus macrophyllus* (Willd.) Britton).

♂ ♂ *Stem scabrous, hispid, or hirsute.*

H. hirsutus Raf. Stem 2-4 feet high, hirsute; leaves petiolate, ovate-lanceolate, base abrupt or roundish, acuminate, more or less serrate, very rough above, usually rough-hairy beneath; scales ovate-lanceolate, acuminate. Often confounded with the preceding; August-September; frequent; Fayette, Van Buren, Decatur, and Ringgold counties; reported from Scott, Muscatine, Johnson, and Lee counties.

H. laetiflorus Pers. Stem 3-5 feet high, branched above, scabrous or hispid; leaves oval or oblong-lanceolate, acuminate both ways, more or less serrate, rough on both sides, thinner than the preceding; heads rather short-peduncled; scales in 2 or 3 rows, ovate to oblong-lanceolate, acuminate; rays numerous; disk yellow. Prairies; August-September; infrequent; Jackson, Muscatine, and Johnson counties; reported from Fayette and Story counties.

H. tuberosus L. *Jerusalem Artichoke.* Stem branching above, 4-8 feet high, pubescent or hirsute; leaves of the branches and upper part of the stem usually alternate, all oblong-lanceolate to ovate or subcordate, petioled, acuminate, coarsely serrate, scabrous above, shortly pubescent or cinereous beneath; scales lanceolate, attenuate. The variety *SUBCANESCENS* Gray, has the leaves densely white canescent beneath and is found in Fayette county. Moist soil; September; frequent; Winneshiek, Floyd, Henry, Van Buren, Decatur, Dickinson, and Winnebago counties; reported from Fayette, Muscatine, Lee, Story, Boone, Emmet, Woodbury, and Sioux counties.

ACTINOMERIS Nutt. Perennials, with simple or somewhat branched stems, and feather-veined decurrent leaves. Heads corymbed, many-flowered; rays yellow, few, neutral. Involucral scales foliaceous, nearly equal. Receptacle chaffy.

A. squarrosa Nutt. Stem 4-9 feet high, winged; leaves alternate or lower opposite, oblong or ovate-lanceolate, tapering both ways, more or less serrate; rays 2-8, irregular; achenes flat, obovate, broadly winged; pappus of 2-3 awns. Low woods; July-August; frequent in the eastern, southeastern, southern, and central counties; Johnson, Appanoose, Decatur, Ringgold, Page, and Fremont counties; reported from Scott, Muscatine, Des Moines, Henry, and Story counties. (*Verbesina alternifolia* (L.) Britton).

COREOPSIS L. TICKSEED. Annual or perennial herbs, with opposite leaves, and mostly yellow flowers. Involucre double, of about 8 scales to each part, outer foliaceous, more or less spreading, inner somewhat membranous, appressed. Receptacle flat, with deciduous chaff. Pappus commonly of 2 teeth or awns, barbed upwardly, sometimes wanting. Achenes flattened parallel with the involucral scales.

C. palmata Nutt. Perennial; stem 1-3 feet high, simple, rigid, glabrous; leaves sessile, rigid, 3-nerved at the base, cuneiform in outline, 3-cleft to or below the middle, rarely undivided; divisions linear, slightly narrower than the base, entire or 1-3 cleft; outer scales linear, equaling the inner, more or less united at the base. Prairies; June-July; common throughout the state.

C. tripteris L. Stem simple, 4-8 feet high, or corymbed above, smooth; leaves petiolated, 3-5-divided, leaflets lanceolate, tapering both ways, entire; outer scales shorter, all united at the base. Woods; August-September; in-

frequent; Johnson, Muscatine, Story, Decatur, Ringgold, and Taylor counties.

BIDENS L. Annual herbs, with opposite variously cut or divided leaves, and yellow flowers. Involucre double, the outer usually foliaceous. Receptacle flat, chaffy. Rays 4-8, neutral, or none. Pappus of 2-4 awns, roughened backward. Achenes slender, quadrangular or flattened parallel with the involucral scales.

* *Plants terrestrial; leaves lanceolate, serrate, undivided, rarely lobed.*

† *Rays present, conspicuous, sometimes wanting in B. cernua.*

B. chrysanthemoides Mx. Stem 6-24 inches high, erect or reclining below; leaves sessile, lanceolate, tapering both ways, serrate, connate; heads erect; outer involucre shorter than the rays; achenes 2-4-awned. Wet places; August-September; common; Winneshiek, Johnson, Floyd, Story, Decatur, Winnebago, and Emmet counties; reported from Fayette, Muscatine, and Woodbury counties. (*B. lucis* (L.) B. S. P.)

B. cernua L. Stem 6-24 inches high, nearly smooth; leaves lanceolate, sessile, sometimes slightly connate, coarsely serrate; heads nodding, rays few or none; outer involucral scales longer than the head; achenes usually 4-awned. Wet places; July-September; common; Johnson and Decatur counties, reported from Fayette, Scott, Henry, Lee, Story, and Emmet counties.

†† *Rays rudimentary or none.*

B. comosa (Gray) Wiegand. Stem 1-3 feet high, straw-colored; leaves short-petioled, lanceolate, coarsely serrate, petioles broadly margined; outer involucral scales foliaceous, 2-4 times as long as the heads; corollas pale greenish yellow, mostly 4-lobed; pappus awns usually 3. Moist soil; August-September; probably common; Johnson and Decatur counties; reported from Fayette county. (*D. connata comosa* Gray). Probably confused with the following.

B. connata Muhl. *Swamp Beggar-ticks.* Stem 1-5 feet high, purple; leaves thicker and greener than in the preceding, lanceolate or oblong-lanceolate, coarsely serrate, petioled; involucral bracts not foliaceous; disk-flowers orange; achenes with 2-4 awns. Wet places; August-September, common; reported from Fayette, Johnson, Henry, and Story counties.

** *Plants terrestrial leaves mostly 1-3-parted or dissected.*

† *Rays short, rudimentary, or none.*

B. frondosa L. *Beggar-ticks.* Stem 2-4 feet high, branching, smooth or somewhat hairy; leaves petioled, 3-5-divided, divisions mostly stalked, lanceolate, serrate; outer involucral scales slender, much longer than the head, ciliate below; rays wanting; achenes with 2 long retrose barbed awns. Moist ground; July-September; common.

†† *Rays large and conspicuous.*

B. aristosa (Mx.) Britton. Stem much branched, 1-3 feet high; leaves thin, pubescent beneath, slender petioled, the lower pinnately 5-7-divided, segments lanceolate, serrate, incised or pinnatifid, upper leaves less divided; involucral bracts glabrous or ciliate, short, the outer linear or spatulate, usually ciliate, not exceeding the inner; awns slender, 2, barbed, as long as the achene. Low grounds; August-September; reported from Muscatine and Benton counties. (*Coreopsis aristosa* Mx.)

B. involucrata (Nutt.) Britton. Stem 1-3 feet high, much branched, minutely pubescent; leaf-segments linear-lanceolate, long-acuminate, incised or pinnatifid; outer involucral bracts linear-lanceolate, hispid and ciliate,

much exceeding the inner ones; awns 2, short. Low grounds, waste places; July-September; common; Johnson and Decatur counties; confused with the preceding which it much resembles. (*Coreopsis involucrata* Nutt.)

* * * *Plants aquatic, submersed leaves filiformly dissected.*

B. beckii Torr. *Water Marigold.* Aquatic perennial. This species was observed by Hitchcock in a pond in Story county in 1883 but no specimens were collected.

HELENIUM L. Erect branching perennials, with alternate decurrent leaves, and many-flowered radiate-heads. Rays several, cuneate, fertile, 3-5-cleft. Involucral scales linear, reflexed. Receptacle convex to oblong, naked. Pappus of 5-9 one-nerved thin scales. Achenes turbinate, ribbed.

H. autumnale L. *Sneezeweed.* Stem 1-6 feet high, nearly smooth, narrowly wing-angled; leaves lanceolate, sessile, tapering both ways, toothed; disk and ray-flowers yellow. Pastures, preferring alluvial soil; August-September; common; Winneshiek, Allamakee, Clinton, Scott, Muscatine, Des Moines, Johnson, Floyd, Jefferson, Decatur, Taylor, Fremont, Hancock, Lyon, Dickinson, and Emmet counties; reported from Fayette, Story, Harrison, and Woodbury counties.

DYSODIA Cav. Annual or biennial herbs, dotted with large pellucid glands which exhale a strong odor. Leaves mostly opposite. Heads many-flowered, usually radiate; rays pistillate. Involucral scales in one row, partially united. Pappus of one row of scales dissected into capillary rough bristles. Achenes 4-angled.

D. chrysanthemoides Lagasca. *Feld Marigold.* Stem 6-15 inches high, much branched, smooth; leaves pinnately parted, the divisions narrow, bristle-toothed or cut; heads with a few short rays. Roadsides and waste places. August-September; common; an emigrant from the west. (*D. papposa* (Vent.) A. S. Hitchcock).

ANTHEMIS L. Ours annual branching herbs, with 1-3-pinnately dissected leaves, and solitary terminal heads. Rays white, pistillate or in the first neutral; disk-flowers yellow. Involucral scales small, scarious, imbricated, shorter than the disk. Pappus wanting or a mere border. Achenes terete or ribbed.

A. cotula L. *Mayweed, Dog-fennel.* Stem about a foot high, nearly smooth, leaves finely 3-pinnately dissected; pappus none; an ill-scented herb. Roadsides and waste places; June-September; common.

A. arvensis L. *Corn Chamomile.* Similar to the preceding but not ill-scented; stem pubescent; pappus a mere border. This species has been found rarely in Story and Muscatine counties.

ACHILLEA L. Perennial herbs, with small corymbose heads, and alternate much divided leaves. Heads many-flowered; rays few, fertile. Involucral scales with scarious margins, imbricated. Receptacle convex or flattish, chaffy. Pappus wanting. Achenes oblong, flattened, margined.

A. millefolium L. *Common Yarrow or Milfoil.* Stem simple, 1-2 feet high; leaves 2-pinnately-parted; divisions linear, crowded, 3-5-cleft; heads in a flat-topped corymb; rays 4-5, short, white or rose color. Prairies, fields, and open woods; June-September; common.

CHRYSANTHEMUM L. Perennial herbs, with toothed, divided, or pinnatifid leaves, white fertile rays, and yellow disk flowers. Involucra broad, depressed, of many imbricated scarious-margined scales. Receptacle flat or convex, naked. Pappus wanting. Achenes striate, similar.

C. leucanthemum L. *Or-eye or White Daisy.* Stem 1-2 feet high, simple or branched; lower leaves spatulate, petioled, more or less pinnatifid; upper leaves clasping, toothed; heads large, solitary, terminating stem or branches. Fields and waste places. June-September; infrequent but widely distributed; Allamakee, Dubuque, Johnson, Decatur, Page, and Cerro Gordo counties; reported from Muscatine, Story, Cass, Hardin, and Woodbury counties.

TANACETUM L. Strong-scented perennials, with alternate 1-3-pinnately dissected leaves, and corymbose yellow discoid heads. Involucre hemispherical; the scales small, imbricated. Receptacle convex. Pappus a mere border. Achenes angled or ribbed, terminated by a large flat disk.

T. vulgare L. *Common Tansy.* Stem 2-3 feet high, smooth; leaflets oblong-lanceolate, cut-toothed or pinnatifid; pistillate flowers tubular, with an oblique 3-toothed limb; pappus 5-lobed. Along roadsides and in waste places: August-September; infrequent; Winneshiek, Allamakee, Johnson, and Decatur counties; reported from Fayette and Story counties.

ARTEMISIA L. *Wormwood.* Annual, biennial or perennial plants with entire, toothed, lobed, or dissected, alternate leaves, and nodding heads which are in panicled spikes or racemes. Involucre obovoid, imbricated, of dry connivent scales. Receptacle small, naked. Heads discoid; flowers few to many, tubular, perfect, or the marginal pistillate. Pappus wanting. Achenes obovoid, capped by a small disk.

* *Marginal flowers pistillate and fertile; disk-flowers perfect but sterile.*

† *Leaves pinnately dissected into narrowly linear lobes.*

A. caudata Mx. Biennial, stem smooth, simple, 2-4 feet high; leaves 1-3-pinnately divided; the segments alternate, filiform; heads small, globose, numerous, in an elongated panicle. Sandy soil, August-September; common locally; Winneshiek, Muscatine, Johnson, Cerro Gordo, Emmet, Winnebago, and Lyon counties; reported from Fayette and Story counties.

A. canadensis Mx. Biennial or perennial; stem 1-2 feet high, pubescent or glabrous; leaves usually pubescent, the lower petioled and 2-pinnately divided into linear lobes, upper leaves sessile, less divided; heads short-peduncled, in narrow panicles, usually numerous. Dry soil; July-August; reported from Woodbury and Lyon counties.

† † *Leaves linear, entire or the lower 3-cleft.*

A. dracunculoides Pursh. Perennial, stem 3-4 feet high, glabrous or canescent when young, branched; leaves linear, entire or lower trifid; heads small, numerous, in an open panicle. Dry or prairie soil; August-September; frequent; Winneshiek, Floyd, Muscatine, Hancock, Dickinson, and Emmet counties; reported from Fayette and Story counties.

* * *Flowers all fertile, the marginal pistillate; receptacle hairy.*

A. frigida Willd. Whole plant silky-canescens; stems in tufts, 6-15 inches high; leaves pinnatifid; segments linear, 3-5-cleft; heads small, globose, drooping, racemose. Sterile soil; July-September; infrequent; Lyon county.

A. absinthium L. *Common Wormwood.* Shrubby, finely canescent; stems 1-4 feet high, much branched; leaves 1-3-pinnately divided into obovate or oblong obtuse lobes, lower long petioled, the upper short-petioled or sessile, the uppermost linear and entire; heads many, drooping, yellow, short-peduncled, racemose-paniculate. Reported from Fayette county as a rare escape.

* * * *Flowers all fertile, the marginal pistillate; receptacle smooth.*

† *Leaves dissected.*

A. annua L. Stem 1-4 feet high, branching, glabrous, leaves 2-3-pi-

nately dissected, segments oblong, deeply pinnatifid; heads small, in an ample panicle. Waste places; July-September; infrequent. Muscatine and Decatur counties; reported from Keokuk county.

A. biennis Willd. Biennial; stem simple, erect, 1-4 feet high, glabrous; leaves 1-2-pinnately divided; divisions linear, entire or cut-toothed; heads globular, erect, in axillary spikes, collectively in a narrow leafy panicle. Dry soil; August-September; frequent.

† *Leaves serrate or entire, not pinnatifid.*

A. serrata Nutt. Perennial; stem leafy, 5-9 feet high; leaves lanceolate, serrate, whitened beneath, the upper often linear; heads small, few-flowered, greenish. Bottom lands; August-September; frequent; Winneshiek, Jackson, and Muscatine counties; reported from Fayette, Poweshiek, Story, Winnebago, and Cerro Gordo counties.

A. gnaphalodes Nutt. Perennial; whole plant woolly-canescens; stem 2-4 feet high, branched; leaves lanceolate, entire, or lower toothed or pinnatifid, upper surface usually glabrate and green; heads ovoid, small, mostly sessile, in narrow leafy panicles. Sandy and prairie soil; August-September; common. (*A. ludoviciana gnaphalodes* T. & G.)

SENECIO L. Herbs, with alternate leaves, solitary or corymbed heads, and mostly yellow flowers. Heads many-flowered; flowers all tubular and perfect or else the marginal ligulate and pistillate. Involucre of many equal erect-connivent scales, sometimes with a few bractlets at the base. Receptacle flat, naked. Pappus of copious soft capillary bristles.

S. aureus L. *Golden Ragwort*. Perennial; stems 1-3 feet high, glabrous or woolly when young; radical leaves thin, simple, orbicular or ovate-oval, crenate-toothed, long-petioled; lower lyrate-pinnatifid; upper sessile or partly clasping, dentate or incised; rays 8-12. Wet woods and meadows; May-June; Johnson county; reported from Winneshiek, Fayette, Story, and Woodbury counties; perhaps frequent and widely distributed but has been confused with the following.

S. balsamitae Muhl. Stems a few inches to two feet high; radical leaves oblong or spatulate, varying to lanceolate, tapering to the petiole, serrate, upper lanceolate, laciniate or pinnatifid, petioled or the uppermost sessile. Dry and rocky woods; May-July; common; Winneshiek, Allamakee, Scott, Johnson, Decatur, and Shelby counties; reported from Fayette, Muscatine, and Story counties. (*S. aureus balsamitae* T. & G.)

S. obovatus Muhl. Stems 1-2-feet high; leaves rather thick, the basal obovate or spatulate, very obtuse, base cuneate, crenate-dentate, with short margined petioles, or the earliest nearly sessile in rosulate tufts; stem leaves few, sessile; oblong to spatulate, incised or pinnatifid. Wet prairies; April-June; reported from Story county. (*S. aureus obovatus* T. & G.)

S. lugens Richards. Stem stout, 1-3 feet high; basal and lower leaves oblong, oval or slightly spatulate, denticulate, narrowed into margined petioles, upper leaves sessile, bract-like; heads corymbose; involucral scales lanceolate or oblong-lanceolate, with black tips. Moist soil; June-August; reported from Plymouth county.

S. palustris Hook. Annual or biennial; stem 6-20 inches high, woolly or villous, sometimes at length glabrate; leaves oblong-lanceolate, toothed or laciniate, the upper cordate-clasping; involucre naked below; rays many, pale yellow; pappus copious. Wet ground; June-August; Emmet, and Cerro Gordo counties; reported from Dickinson county.

CACALIA L. INDIAN PLANTAIN. Tall perennials, with alternate leaves, and discoid heads in flat corymbs. Flowers white or whitish, all tubular; corolla deeply 5-cleft. Involucra cylindric, the scales in one row, erect-conivent, with a few bractlets at the base. Pappus of capillary bristles.

* Heads 25-30-flowered.

C. suaveolens L. Stem 3-5 feet high, glabrous, grooved; leaves triangular-lanceolate, halberd-shaped, acuminate, serrate, wing-petioled. Woods; August-September; infrequent; Winneshiek, Fayette, and Muscatine counties; reported from Jackson and Scott counties. (*Synosma suaveolens* (L.) Raf.)

** Heads 5-flowered; involucra of 5 scales.

C. reniformis Muhl. Stem 3-8 feet high, angulate, grooved, not glaucous, leaves green on both sides, lower leaves reniform, very large, long-petioled, upper dilated fan-shaped, toothed and angled, palmately-veined, petioled. Rich woods; July-September; infrequent; Winneshiek, Allamakee, and Johnson counties; reported from Fayette county. (*Mesadenia reniformis* (Muhl.) Raf.)

C. atriplicifolia L. Stem terete; 3-5 feet high, grooved, glaucous; leaves palmately-veined and angulately-lobed, toothed, petioled, glaucous beneath; lower triangular-reniform, or slightly cordate. Rich woods; August-September; frequent; Muscatine, Johnson, Jefferson, Henry, Des Moines, Van Buren, Decatur, Union, Ringgold, Taylor, Page, Fremont, and Pottawattamie counties. (*Mesadenia atriplicifolia* (L.) Raf.)

C. tuberosa Nutt. Stem grooved and angled, 2-6 feet high, glabrous, from a tuberous root; leaves oval or oblong, entire or obscurely toothed, thick, 5-7-nerved; lower with long petioles, upper with short margined petioles. Wet prairies; June-August; frequent; Allamakee, Fayette, Johnson, Appanoose, Decatur, Union, Adams, Ringgold, Taylor, Page, Pottawattamie, Shelby, Hancock, Winnebago, Cerro Gordo, Dallas, Webster, and Emmet counties; reported from Scott, Story, and Woodbury counties. (*Mesadenia tuberosa* (Nutt.) Britton).

ERECHTITES Raf. Ill-scented annuals, with alternate simple leaves, and paniculate-corymbed discoid heads of whitish flowers. Involucra cylindrical, of linear scales, in one row, with a few bractlets at the base. Flowers many, all tubular, fertile, the marginal pistillate, the central perfect. Pappus of soft capillary bristles.

E. hieracifolia (L.) Raf. *Fireweed*. Stem grooved, 1-4 feet high, often hairy; leaves lanceolate, or oblong, acute, unequally toothed, sessile, upper auricled. Rich open woods and burnt clearings; August-September; frequent; Winneshiek, Johnson, Des Moines, Lee, Decatur, and Calhoun counties; reported from Fayette and Story counties.

ARCTIUM L. Biennial herbs, with large petioled alternate leaves, and solitary or clustered discoid heads. Involucral scales numerous, imbricated, long-attenuated, with hooked tips. Heads globose, many-flowered; flowers tubular, perfect. Receptacle bristly. Pappus of numerous, rough, deciduous bristles. Achenes oblong, flattened.

A. minus Schk. *Burdock*. Stem 2-4 feet high, branched; leaves thin, broadly ovate, with a cordate base, or lanceolate with a cuneate base, smooth above, pale-canescens beneath; heads many, racemose on the branches, short-peduncled or sessile, about half an inch broad, inner bracts not exceeding the

pink-purple flowers. Waste and cultivated grounds; July-October; common. (*A. lappa minus* Gray.)

CNICUS L. THISTLE. Biennials or perennials, with sessile alternate leaves, and large terminal discoid heads. Involucre ovoid or spherical; scales numerous, spinous-tipped or unarmed, in many rows. Receptacle bristly. Flowers tubular, perfect. Style nearly undivided. Pappus copious, plumose, deciduous. Achenes oblong, compressed, smooth.

C. lanceolatus (L.) Willd. Common T. Stem 2-4 feet high; leaves sessile, decurrent, pinnatifid, hairy above, white-woolly beneath, lobes spiny; heads purple; scales lanceolate, spreading, all tipped with a spine. Waysides and pastures; July-September; common. (*Carduus lanceolatus* L.)

C. altissimus (L.) Willd. Stem 2-6 feet high; leaves oblong-ovate to lance-oblong, rough-hairy above, white-woolly beneath, undivided to sinuate-toothed, or sinuate-pinnatifid, lobes or teeth prickly; heads large; scales lance-ovate, outer with spreading spines; flowers purple. Fields and open woods; August-September, common. (*Carduus altissimus* L.) The variety *FILIPENDULUS* Gray, is 2-3 feet high; roots tuberous; leaves deeply pinnatifid. Emmet county; reported from Cass, Cherokee, Palo Alto, and Woodbury counties.

C. discolor Muhl. Similar to the preceding; leaves deeply pinnatifid into lanceolate or linear segments. Fields and borders; July-September; reported common. Variable and seems to pass into, the preceding. (*Cnicus altissimus discolor* Gray. *Carduus discolor* (Muhl.) Nutt.)

C. hillii Canby. Stem 1-2 feet high, simple or branched; root fusiform; leaves green on both sides, lobed or pinnatifid; lobes rounded, dentate or prickly; lower leaves spatulate-oblong, narrowed to the base or petioled, the upper oblong, sessile and clasping; outer involucral scales ovate-lanceolate, tipped with short bristles, very glutinous on the back, inner narrowly lanceolate and acuminate. Fields; June-July; reported from Story county (*Carduus hillii* (Canby) Porter).

C. arvensis (L.) Hoffm. *Canada* T. Perennial, stem 1-2 feet high, with a long running root; leaves oblong-lanceolate, sinuate-pinnatifid, prickly, smooth or slightly woolly beneath; heads small; flowers rose-purple, imperfectly dioecious; scales triangular, appressed, minute, prickly-pointed. Cultivated fields; infrequent but widely distributed. (*Carduus arvensis* (L.) Robs.)

AMBROSIAEAE Reichenb. RAGWEED FAMILY.

Annual or perennial herbs, mostly of a weedy aspect, with alternate leaves, or the lower opposite, and small heads of greenish or whitish, monoeious or dioecious flowers. Staminate and pistillate flowers in the same head, or in separate heads. Involucral scales few, separate or united. Receptacle chaffy. Corolla wanting in the pistillate flowers or reduced to a short tube or ring; the calyx-limb none or a mere border; style 2-cleft. Corolla in the staminate flowers tubular, funnelform, or obconic, 4-5-lobed; stamens usually 5, separate, or the anthers merely connivent. A family often included in the COMPOSITAE from which it is mostly distinguished by the anthers not being truly syngenesious.

* *Staminate and pistillate flowers in the same heads.*

Iva. Represented in our flora by a single species.

* * *Staminate and pistillate flowers in separate heads.*

AMBROSIA. Involucral bracts of the staminate heads united.

XANTHIUM. Involucral bracts of the staminate heads separate: involucre of the pistillate heads closed, covered with hooked spines.

IVA L. Herbaceous or shrubby plants, with opposite or alternate leaves, and small nodding greenish-white discoid heads. Fertile and sterile flowers in the same head. Anthers nearly separate. Involucral scales 3-9, roundish. Receptacle small, chaffy. Achenes obovoid or lenticular.

I. xanthiifolia (Fresen.) Nutt. *Marsh Elder.* Annual, stem tall, 4-10 feet high, roughish; leaves mostly opposite, petioled, ovate, rhombic or cordate, lobed, doubly serrate or cut toothed, hoary; flowers in terminal or axillary panicled spikes, bracts not obvious; fertile flowers 5, corolla rudimentary or wanting. Waste grounds; July-September; common in the western counties but less frequent eastward.

AMBROSIA L. Annual or perennial, herbs, with opposite or alternate lobed or pinnatifid leaves, and inconspicuous greenish flowers in spike-like racemes. Flowers monoecious; fertile 1-3 together, axillary, near the base of the raceme; the involucre oblong, closed, achene-like; pistil with 2 long protruding styles; stamens wanting; sterile flowers many, surrounded by a depressed hemispherical cup formed from united scales. Anthers nearly separate. Pappus wanting. Achenes ovoid.

* *Leaves opposite, palmately lobed or undivided; receptacle naked.*

A. trifida L. *Great Ragweed.* Annual; stem stout, 3-12 feet high, hairy; leaves opposite, petioled, hairy, deeply 3-lobed, lobes oval, long-pointed, serrate; petioles margined; fruit obovate, 5-6 ribbed, and tubercled. Low grounds; July-September; common. The variety **INTEGRIFOLIA** T. & G., a smaller form, has ovate undivided leaves. This and intermediate forms are frequently found.

* * *Leaves opposite and alternate, pinnatifid; receptacle chaffy.*

A. artemisiæfolia L. Annual; stem 1-3 feet high, much branched, hairy or rough-pubescent; leaves opposite or alternate, thin, mostly twice pinnatifid, smooth above, hoary beneath; petioles ciliate; fruit obovoid or globular, armed with 6 short teeth. Fields and waste places; July-September; common.

A. psilostachya DC. Perennial with slender running rootstocks; stem 2-4 feet high, paniculately branched, whitish, hispid; leaves thickish, mostly once pinnatifid; fruit obovoid, tubercles small or wanting. Low grounds and prairies; July-September; common in western Iowa, rare eastward; Fremont, Decatur, and Johnson counties; reported from Pottawattamie, Story, Fayette, and Muscatine counties.

XANTHIUM L. Annuals, with alternate petioled leaves, and monoecious heads of flowers. Fertile flowers in clusters, the sterile in racemes above. Sterile involucres of separate scales; receptacle cylindric. Fertile involucre closed, coriaceous, covered with hooked prickles, 2-celled, 2-flowered. Pappus wanting. Corolla thread-form. Anthers nearly separate. Achenes oblong, flat.

X. canadense Mill. *Cocklebur.* Stem 1-3 feet high, frequently brown spotted; leaves ovate or cordate, 3-nerved, dentate, frequently lobed; fruit about 1-inch long, densely prickly, beaks hooked or incurved. Fields and waste places; July-September; common.

CICHORIACEAE *Reichenb.* CHICORY FAMILY.

Herbs, usually with acrid or milky juice, alternate or basal leaves, and yellow, blue, purple, or white flowers in involucrate heads. Involucral bracts in one to several series. Receptacle flat or flattish, scaly, smooth, pitted, or alveolate. Flowers all alike, perfect. Calyx-tube adnate to the ovary, the limb of scales, or bristles, or both, or wanting. Corolla gamopetalous, ligulate; tube short or long; ray usually 5-toothed. Anthers 5, united into a tube around the style, sagittate or auricled below, usually appendaged above. Ovary 1-celled, 1-ovuled; style 2-cleft or 2-lobed. Fruit an achene. This family is usually regarded as a tribe of the COMPOSITAE and is also known as LIGULIFLORAE.

* *Pappus of scales, or of scales and bristles.*

CICHORIUM. Flowers blue or white; involucre double; pappus of blunt scales.

KRIGIA. Flowers yellow; involucre simple; pappus of chaff and bristles.

* * *Pappus plunose.*

TRAGOPOGON. Stems leafy; involucre simple; plume branches of the pappus interwebbed.

* * * *Pappus of capillary bristles, not plunose.*

† *Achenes cylindric, prismatice or terete, not flattened.*

‡ *Achenes not beaked.*

HIERACIUM. Flowers yellow or orange, sometimes red; pappus tawny.

PRENANTHES. Flowers white, cream-color, or purple; pappus tawny or brown; heads often nodding.

LYGODESMIA. Flowers pink or purple; pappus white; heads erect.

‡ ‡ *Achenes beaked, sometimes beakless in Trōximon; flowers yellow; heads solitary, scapose.*

TRÖXIMON. Involucre loosely imbricated; achenes 10-ribbed.

TARAXACUM. Involucre calyculate; achenes 4-5-ribbed.

† † *Achenes flat or flattish; pappus white; involucre imbricated; heads panicled.*

LACTUCA. Flowers yellow or purplish; achenes more or less beaked.

SONCHUS. Flowers yellow; achenes flattish, beakless.

CICHORIUM L. Erect branching perennials, with deep roots, alternate and basal leaves, and axillary and terminal heads. Involucre of two series of herbaceous bracts. Receptacle flat, naked, or slightly fimbriate. Achenes 5-angled or 5-ribbed, truncate, beakless. Pappus of 2 or 3 short blunt scales, forming a crown.

C. intybus L. *Chicory.* Basal leaves on the ground, runcinate-pinnatifid, narrowed to long petioles; stem-leaves lanceolate or oblong, lobed or entire, base clasping and auricled; heads many. Waste places; July-September; reported from Fayette, Scott, Polk, Adams, and Woodbury counties.

KRIGIA Schreber. Ours a perennial, with scape-like stems, mostly radical leaves, and several to many-flowered heads. Involucral scales in 2 rows. Pappus double, the outer of scales, the inner capillary.

K. amplexicaulis Nutt. Roots fibrous; stem 1-2 feet high, smooth, with 1-2 leaves; cauline leaves sessile, clasping, oblong or oval, mostly entire; radical on winged-petioles, entire or toothed, rarely pinnatifid; heads 2-5, peduncled. Rich woods; May-June; frequent; Winnesheik, Allamakee, Jones, Muscatine, Johnson, Henry, Lee, and Cerro Gordo counties, reported from Fayette and Scott counties. (*Tragopogon virginicum* L. *Adopogon virginicum* (L.) Kuntze).

K. dandelion (L.) Nutt. Scape slender, leafless, with a solitary head, 6-18 inches high; roots tuberiferous; leaves basal, tufted, linear-lanceolate to

spatulate, entire, denticulate, sinuate, or pinnatifid. Moist soil; April-June; reported from Woodbury county.

TRAGOPOGON L. Glabrous biennials, rarely perennials, from long descending roots, with elongated-linear, nervose, entire, clasping leaves, and solitary heads of yellow or purple flowers. Involucre simple, of several large equal lanceolate acuminate scales. Pappus plumose. Achenes narrow, striate, with a long filiform beak.

T. pratensis L. *Goat's-beard.* Stem 1-3 feet high, bases of the leaves expanded; flowers yellow; peduncle scarcely thickened. Fields; May-June; infrequent; Dickinson county; reported from Fayette, Johnson, Jasper, and Story counties.

T. porrifolius L. *Oyster-plant.* Flowers violet-purple; peduncle thickened and hollow. Reported from Story county.

HIERACIUM L. *Hawkweed.* Perennials, with alternate leaves, and few to many heads of yellow orange or red flowers. Involucre more or less imbricated. Pappus tawny, of capillary bristles. Achenes striate, oblong or cylindrical.

H. canadense Mx. Stems 1-3 feet high, leafy, erect, pubescent to nearly smooth, corymbed above; leaves sessile, ovate-oblong to lanceolate, entire or with a few remote teeth; involucre regularly imbricated; heads large, many-flowered; pappus of numerous unequal bristles; achenes brown, cylindrical. Upland woods and prairies; August-September; infrequent; Emmet, Winnebago, Fayette, Floyd, Muscatine, Johnson, and Winnebago counties.

H. scabrum Mx. *Rough Hawkweed.* Stem hirsute, 2-3 feet high; leaves obovate to oval, hairy, sessile, nearly entire; heads small, corymbose, many-flowered; involucre scarcely imbricated; pedicles and involucre clothed with dark glandular bristles; achenes red, cylindrical. Dry upland woods; August; infrequent; Muscatine, Johnson, Appanoose, Decatur, and Ringgold counties; reported from Fayette and Story counties.

H. longipilum Torr. *Long-bearded H.* Stem 1-4 feet high, clothed with long erect shaggy hairs, leafy below, naked above; leaves oblong-lanceolate or spatulate, entire, sessile, hairy like the stem; heads in a small raceme; achenes narrowed at the apex. Prairies; July-August; infrequent; Muscatine, Decatur, and Taylor counties; reported from Story county.

H. aurantiacum L. Stem 6-20 inches high, usually leafless, hirsute; basal leaves spatulate or oblong, entire or denticulate; flowers orange or red. Waste places; reported from Story county.

PRENANTHES L. Perennials, with alternate leaves, and racemose-panicle mostly nodding heads. Involucre cylindrical; scales linear, several, in one row, with a few bractlets at the base. Receptacle naked. Pappus of rough capillary bristles, brownish or straw color, copious. Achenes not beaked, linear-oblong, striate.

* *Bracts of the involucre hirsute-pubescent.*

P. aspera Mx. Stem 2-4 feet high, rough-pubescent to smoothish; leaves oval-oblong or lanceolate, dentate to nearly entire, sessile, not clasping; heads mostly erect, in small clusters, disposed in a long thyrsus; flowers yellowish cream-color. Upland woods and prairies; August-September; infrequent; Scott, Emmet, Decatur, and Ringgold counties; reported from Fayette, Muscatine, and Story counties. (*Natalus asper* (Mx.) T. & G.)

P. racemosus Mx. Stem 2-4 feet high, simple, smooth, glaucous; leaves oval or oblong-lanceolate, smooth, denticulate, lower tapering to winged

petioles, upper clasping; thyrsus 4-20 inches long; involucre hirsute; flowers purplish. Low prairies; August-September; frequent; Emmet, Hancock, Floyd, and Lyon counties; reported from Fayette and Story counties. (*N. racemosus* (Mx.) DC.)

P. crepidinea Mx. Stem 4-8 feet high, branched above; glabrous or minutely pubescent; leaves ample-ovate, triangular-ovate or hastate, toothed, wing-petioled; heads nodding, in loose clusters, corymbosely-paniculate, involucre hirsute; flowers cream-color. Woods; August-September; rare; Johnson county. (*N. crepidineus* (Mx.) DC.)

* * *Bracts of the involucre glabrous or sparingly hirsute.*

P. alba L. Stem 2-4 feet high, smooth, purplish, corymbosely-paniculate above; leaves angulate or deltoid-hastate, sinuate toothed, on long slender margined petioles; heads nodding, involucral scales about 8, purplish; pappus reddish-brown. Upland woods; August-September; frequent; Winneshiek, Clayton, Floyd, Jackson, Lee, and Winnebago counties; reported from Fayette, Scott, Muscatine, Story, and Emmet counties.

LYGODESMIA D. Don. Perennials, with rush-like stems, linear-subulate leaves, and long peduncled rose-colored flowers. Involucre cylindrical, elongated. Pappus whitish, soft, copious. Achenes striate, terete.

L. juncea (Pursh) D. Don. Stem about one foot high, much branched, striate, from a deep-rooted base, nearly leafless; leaves small, lance-linear, the upper minute, subulate; heads 5-flowered; involucre about a half inch high. Fields and waste places; June-August; common in western Iowa; Emmet, Lyon, Shelby, Fremont, and Dickinson counties; reported from Sioux, Woodbury, Harrison, Monona, and Ida counties.

TROXIMON Nutt. Perennials, with tufted root leaves, and simple scapes bearing a solitary head of yellow flowers. Involucre campanulate; scales lanceolate or ovate, in 2 or 3 rows, pointed. Pappus white, copious, capillary. Achenes linear-oblong, about 10-ribbed, beakless.

T. cuspidatum Pursh. Scape 4-10 inches high, from a thick fusiform root; leaves elongated linear-lanceolate, tapering both ways, woolly-margined; head solitary, large, many-flowered. Prairies; April-May; infrequent; Shelby, Emmet, Calhoun, Marshall, Johnson, and Lyon counties; reported from Fayette, Scott, and Story counties. (*Nothocalais cuspidata* (Pursh) Greene).

TARAXACUM Haller. Stemless perennials, with lyrate-pinnatifid root-leaves, and yellow flowers. Heads solitary, many-flowered. Involucre double; the outer of short small scales, reflexed; the inner linear, much longer, in one row, appressed. Receptacle naked. Pappus white, capillary, copious.

T. officinale Weber. *Common Dandelion.* Scapes 4-18 inches high, hollow, from a thick descending root. Involucre reflexed at maturity of the fruit; exposing the achenes and globular head of pappus to the wind. Achenes ovate-oblong to fusiform, apex prolonged into a slender beak which is 2 or 3 times the length of the achene. Fields and waste places; mostly April and May but many appearing until the close of September; common.

LACTUCA L. **LETTUCE.** Annual, biennial, or perennial herbs, with leafy stems, panicled heads, and yellow, blue, or white flowers. Heads few- to many-flowered. Rays truncate, 5-toothed. Involucre glabrous, cylindrical, imbricated in two or more unequal rows. Pappus white, rarely tawny, soft, capillary, copious. Achenes flattened parallel with the scales, abruptly beaked, 3-5-ribbed.

* *Leaves spiny-margined; the midribs spiny or hispid; flowers yellow.*

L. scariola L. *Prickly L.* Stem 2-5 feet high, prickly below, glabrous above; leaves lanceolate to oblong or oblanceolate, sagittate-clasping, spinulose-denticulate or sinuate-toothed, midrib prickly; achenes obovate-oblong, striate-nerved, beak slightly longer than the achene. Waste ground; July-September; becoming frequent throughout the state.

L. ludoviciana (Nutt.) DC. Stem 2-5 feet high, branched, glabrous, leafy; leaves oblong to ovate-oblong, acute, auriculate-clasping, spinulose-denticulate, sinuate-lobed or pinnatifid; heads many, loosely paniculate; flowers yellow; achenes oval or obovate, flat, about the length of the filiform beaks. River banks; July-September; reported from Muscatine, Emmet, Story, and Winnebago counties.

** Leaves neither spiny-margined nor with spiny midribs; sometimes spinulose in *L. integrifolia*.

† Achenes thin, flat; beaks filiform; flowers yellow, blue in *L. pulchella*.

L. canadensis L. *Wild L.* Stem 3-8 feet high, strict, smooth, glaucous; leaves long, sinuate pinnatifid, pale beneath, the margins entire or sparingly dentate; midrib naked or sparsely bristly; achenes oval, 1-nerved, beak slightly shorter. Rich soil; fields and open places; July-September; common.

L. hirsuta Muhl. Stem 2-3 feet high, reddish, somewhat hairy; leaves mostly runcinate pinnatifid, hairy on both sides, or midrib hairy; denticulate. Forms from Winneshiek county possessing the above characters are referred to this species.

L. integrifolia Bigelow. Stem 3-4 feet high, smooth; paniculately branched above; leaves undivided, oblong, oblong-lanceolate or lanceolate, acuminate, denticulate or entire, auriculate-clasping; flowers yellow or purplish; achenes oval, longer than the beak. Rich soil; August-September; infrequent; Decatur, Taylor, and Ringgold counties; reported from Dickinson county. (*L. sagittifolia* Ell.)

L. pulchella (Pursh) DC. Perennial, glabrous, somewhat glaucous; stem slender, 1-3 feet high, branched above; leaves linear-lanceolate, lanceolate, or oblong, acute, entire, dentate, lobed or pinnatifid; the caudine sessile or partly clasping, the lower sometimes petioled; heads many, rays bright blue or violet; achenes oblong-lanceolate, twice the length of the tapering beaks. Fields and waysides; June-September; common in western Iowa, infrequent elsewhere; Fremont, Montgomery, and Pottawattamie counties; reported from Lee, Henry, Poweshiek, Story, Kossuth, and Woodbury counties.

†† Achenes thickish, beakless or with short necks; flowers blue.

L. acuminata Gray. Stem glabrous, 2-6 feet high; leaves ovate-oblong or oblong-lanceolate, frequently sagittate or hastate, simply or doubly toothed, acuminate, wing-petioled; achenes beakless. Open woods; August-September; frequent; Clayton, Dubuque, Johnson, Des Moines, and Decatur counties. (*L. villosa* Jacq.)

L. floridana (L.) Gaertn. Stem 4-8 feet high, smooth; leaves large, wing-petioled, deeply lyrate-pinnatifid, lobes simply or doubly dentate, lateral lobes ovate, terminal deltoid, acuminate; flowers blue; involucre about one-half inch high; pappus bright white; achenes thickish, acuminate, short-beaked. Rich soil, woods; August-September; frequent.

L. leucophœa Gray. Stem 3-12 feet high, glabrous; leaves deeply lobed or pinnatifid, dentate, teeth mucronate-pointed, sessile or the lower petioled, glabrous, sometimes pubescent on the veins beneath; panicle large, rather dense; heads many; rays blue; achenes oblong; compressed, short beaked.

pappus brown. Moist woods; July-September; reported from Fayette and Story counties. (*L. spicata* (Lam.) Hitchcock).

SONCHUS L. Ours coarse annuals, with mostly smooth and glaucous leafy stems and corymbose-paniculate heads of yellow flowers. Leaves spinulose or ciliately dentate, auriculate-clasping. Involucre more or less imbricated, of unequal scales. Pappus soft, white, copious, capillary. Achenes compressed, striate or ribbed.

S. asper (L.) All. Stem smooth, 1-4 feet high; leaves rarely runcinate-pinnatifid, usually undivided, the basal and lower obovate or spatulate, petioled, the upper oblong or lanceolate very spiny-toothed, auricles rounded; achene smooth margined, 3-ribbed on each face. Waste places; July-September; frequent throughout the state.

S. oleraceus L. Stem 2-3 feet high; leaves runcinate-pinnatifid, rarely undivided; with soft spiny or prickly teeth, auricles acute; achenes many-striate, rugulose-scabrous. With the preceding; infrequent; Johnson county; reported from Winneshiek, Clayton, Fayette, Scott, Muscatine, Linn, and Story counties.

CAMPANULACEAE Juss. BELL FLOWER FAMILY.

Herbs, with milky juice, alternate exstipulate leaves, and solitary racemose paniculate or spicate flowers. Calyx persistent, 5-lobed or 5-parted, adherent to the ovary. Corolla regular or irregular, 5-lobed. Stamens 5, separate or connate; anthers 2-celled. Capsule 2-several-celled, many-seeded.

* *Corolla regular; anthers separate.*

CAMPANULA. Flowers complete; corolla bell-shaped, rarely rotate.

SPECULARIA. Early flowers cleistogamous; corolla rotate.

** *Corolla irregular; anthers connate.*

LOBELIA. Our only genus.

CAMPANULA L. Calyx-tube short. Corolla for the most part campanulate. Stamens 5; filaments flattened. Stigma 3-lobed. Capsule 3 celled.

C. americana L. *Tall Bell-flower.* Annual, somewhat hairy; stem 3-6 feet high; leaves ovate-lanceolate, taper-pointed, thin, serrate, petioles margined; inflorescence spicate, 1-2 feet long, flowers sessile, axillary; calyx-lobes long, narrow; corolla light blue, broad; style exserted, declined and curved upwards. Rich soil, woods and fields; July-August; common.

C. rotundifolia L. *Harebell.* Perennial; stem 6-14 inches high, branching, weak, mostly glabrous; radical leaves long-petioled, ovate or reniform-cordate, entire or dentate, soon perishing; caudine leaves linear, entire; flowers on slender pedicels, nodding; calyx-lobes subulate; corolla campanulate, blue. A delicate plant. Rocky woods; June-July; common in northeastern portion of the state; Winneshiek, Allamakee, Clayton, Dubuque, Jackson, Jones, Webster, and Emmet counties; reported from Fayette and Scott counties.

C. aparinoides Pursh. Stem weak, somewhat angular, branched, rough on the angles; leaves linear, mostly entire; flowers on long slender pedicels; calyx-lobes short, triangular; corolla white, campanulate. Wet places; June-August; frequent; Winneshiek, Fayette, Muscatine, Johnson, Hancock, Cerro Gordo, Winnebago, and Emmet counties; reported from Scott and Story counties.

SPECULARIA Heister. Calyx-tube elongated. Corolla rotate. Filaments hairy, shorter than the anthers. Stigmas and cells of the angular capsule 3.

S. perfoliata (L.) A. DC. *Venus Looking-glass*. Annual, stem simple, 5-20 inches high, erect; leaves cordate-clasping, somewhat reniform, crenate; flowers sessile, usually 2-3 in the axils of the upper leaves, corolla conspicuous in but few flowers. Fields and woods; May-August; common. (*Legouzia perfoliata* (L.) Britton).

LOBELIA L. Flowers in some form of a bracted raceme. Corolla tubular, deeply cleft on the upper side, 2-lipped, upper lip 2-lobed, lower 3-lobed. Stamens 5; anthers and usually the filaments united into a curved tube, 2 of the anthers bearded. Style 1. Capsule 2-celled, containing many small seeds, opening loculicidally.

* *Flowers red or scarlet.*

L. cardinalis L. *Cardinal-flower*. Stem 2-4 feet high, simple, glabrous, leafy; leaves oblong-lanceolate, tapering both ways, shortly toothed; flowers conspicuous, deep red or scarlet, in a terminal bracted raceme, stamens exceeding the corolla, calyx-lobes one-half inch long, linear. Damp woods, marshy places; August-September; frequent; Muscatine, Louisa, Des Moines, Johnson, Story, and Appanoose counties; reported from Fayette and Scott counties.

** *Flowers blue, or blue and white.*

† *Flowers rather large, the corolla tube about a half-inch in length.*

L. syphilitica L. *Great Lobelia*. Perennial; stem 1-3 feet high, angular, hairy to glabrous; leaves lanceolate, acute, thin, unequally serrate; flowers blue, varying to white, in a spike-like raceme; calyx hirsute, sinuses with deflexed auricles; corolla about an inch in length. Moist soil; July-September; common.

L. puberula Mx. Finely soft pubescent; leaves thickish, obtuse, denticulate, oval to oblong or obovate, the lower petioled; sinuses of the calyx with small or inconspicuous auricles; corolla about one-half inch in length. Moist soil; August-September; reported from Scott county.

† † *Flowers small; corolla-tube very short.*

L. spicata Lam. Stem simple, erect, 1-3 feet high, pubescent below, less so above; leaves oblong, varying from spatulate below to linear bracts above, obtuse, more or less denticulate; flowers in a slender spike-like raceme; calyx-tube short, hemispherical, teeth long and slender; corolla pale blue, tube one-fourth inch or less in length. Upland fields and meadows; June-July; common. The variety *HIRTILLA* Gray, pubescence somewhat scabrous, bracts and calyx-lobes ciliate or hirsute, occurs along with the type.

L. leptostachya A. DC. Similar to the preceding; sinuses of the calyx with deflexed subulate auricles. Dry soil; June-August; probably belongs to our flora.

L. inflata L. *Indian Tobacco*. A narcotic annual; stem about 1 foot high, simple, erect, branched, hairy or pubescent; leaves ovate, obtusely serrate; flowers small, pedicels shorter than the leafy bracts; pod inflated. Upland woods; July-September; infrequent; Winneshiek, Muscatine, Johnson, Des Moines, Van Buren, Wapello, Appanoose, Louisa, and Decatur counties; reported from Fayette and Story counties.

PYROLACEAE Agardh. WINTERGREEN FAMILY.

Low mostly evergreen perennials, with branched rootstocks, simple petioled exstipulate leaves, and perfect, nearly regular, solitary, racemose, or corymbose flowers. Calyx 4-5-lobed. Corolla of 5 petals or 4-

5-parted, white or pink. Stamens as many or twice as many as the lobes of the corolla, hypogynous; anthers 2-celled, opening by terminal pores, frequently appendaged; pollen composed of four united grains. Ovary superior, 4-5-celled; style often declined; stigma 5-lobed or 5-crenate. Capsule many-seeded.

PYROLA. Leaves basal; flowers racemose.

CHIMAPHILA. Stem decumbent; branches erect, leafy; flowers corymbose.

PYROLA L. Calyx 5-parted, free from the ovary. Petals 5, equal, deciduous. Stamens 10; anthers large, more or less 4-celled, inverted, hanging apparently by the apex, opening above by two pores. Style thick; stigma 5-lobed. Capsule 5-celled, many-seeded.

P. elliptica Nutt. *Shin-leaf.* Stemless; leaves elliptical to oval, thin, obscurely wavy-crenate, petioles marginated; flowers white, many, nodding; calyx minute, lobes ovate; petals oblong, obtuse, much longer than the calyx; style declined and curved. Rich woods; June-August; frequent locally; Winneshiek, Allamakee, Muscatine, and Johnson counties; reported from Fayette county.

P. secunda L. Stem 3-8 inches high; leaves below, petioled, broadly ovate, sub-serrate; flowers in a spicate raceme, turned to one side; calyx-lobes ovate; corolla oblong, whitish; style exserted. Woods; June-July; local; Winneshiek county.

CHIMAPHILA Pursh. Low perennial herbs, with decumbent stems, ascending branches, opposite or verticillate leaves, and white or purplish flowers. Calyx 5 cleft or 5-parted. Petals 5, orbicular, concave, spreading. Stamens 10; filaments pubescent or hairy; anthers as in Pyrola. 2-horned. Ovary 5-lobed, 5-celled; stigma orbicular, 5-crenate. Capsule 5-lobed, 5-celled, 5-valved; seeds numerous, small.

C. umbellata (L.) Nutt. Branches 4-12 inches high, leafy; leaves spatulate or cuneate-ob lanceolate, obtuse or acutish, sharply serrate, evergreen, not mottled; flowers subcorymbose or umbellate. Woods; June-August; reported from Winneshiek and Fayette counties.

MONOTROPACEAE *Lindl.* INDIAN-PIPE FAMILY.

Fleshy saprophytic herbs, with bracted scapes, and solitary or clustered regular perfect flowers. Sepals 2-5, bract-like, deciduous. Petals 4-5, edges connivent. Stamens 8-10; anthers kidney-shaped, 2-celled, becoming 1-celled, opening across the apex. Stigma flattened, about 5-rayed. Capsule grooved, 4-5-celled. Represented in our flora by the genus **MONOTROPA** L.

M. uniflora L. *Indian Pipe. Corpse-plant.* Scape 4-10 inches high, clustered; roots matted, brittle; leaves represented by scale-like bracts, ovate-lanceolate, sessile; flower terminal, solitary, nodding; capsule erect. Whole plant waxy-white, sometimes pink or red, glabrous, turning black in drying. Rich woods; June-August; infrequent; Jones and Johnson counties; reported from Fayette, Floyd, Muscatine, Story, and Woodbury counties.

VACCINIACEAE *Lindl.* HUCKLEBERRY FAMILY.

Ours small shrubs, with scaly buds, alternate simple leaves, and small perfect flowers in clusters or solitary. Calyx-tube adherent to the ovary, the limb 4-5-lobed or 4-5-cleft. Corolla 4-5-lobed. Stamens 8 or 10;

filaments short, usually flattened; anthers 2-celled. Ovary 2-10-celled, becoming a berry or drupe-like fruit.

GAYLUSSACIA. Stamens 10; ovary 10-celled; berry drupaceous, with 10 nutlets.

VACCINIUM. Stamens 8-10; ovary 4-5-celled; the berry 4-5-celled, the cells many-seeded.

GAYLUSSACIA H. B. K. Calyx adherent to the 10-celled, 10-ovuled ovary, the limb persistent, 5-toothed. Corolla tubular or campanulate, 5-toothed. Stamens 10, opening at the apex. Fruit a globular berry-like drupe.

G. resinosa (Ait.) T. & G. *Black Huckleberry*. A much branched shrub, 1-3 feet high; leaves alternate, oval to oblong, clothed with resinous globules, flowers in clustered racemes, turned to one side; fruit edible, ripe in August. Dry hills; May-June; common in a limited area in Wild Cat Den, Muscatine county.

VACCINIUM L. Calyx-limb 4-5-toothed, persistent. Corolla 4-5-toothed or 4-5-lobed. Stamens 8 or 10. Ovary 4-5-celled; ovules usually many.

V. vaccillans Kalm. *Blue Huckleberry*. Shrub, usually 1-2 feet high, much branched; branches glabrous, warty; leaves oblong, oval or obovate, acute or obtuse, mucronulate, glabrous, entire or sparingly serrate, base narrowed or rounded, short-petioled or sessile. Dry soil; May-June; fruit ripe in July-August; reported from Iowa.

PRIMULACEAE *ent.* PRIMROSE FAMILY.

Herbs, with radical or caudine opposite, alternate or verticillate leaves, and regular, usually 5-parted flowers. Stamens as many as the lobes of the corolla, and inserted on the corolla-tube opposite the lobes. Ovary free, rarely adnate to the calyx, 1-celled, with one central free placenta rising from the base.

* *Acaulescent plants.*

DODECATHEON. Corolla reflexed; stamens exserted.

ANDROSACE. Limb of corolla spreading; stamens included.

* * *Caulaceous plants.*

STEIRONEMA. Flowers axillary; stamens 5, alternate with 5 sterile ones or staminodia.

LYSIMACHIA. Flowers axillary, racemose or capitate; staminodia present or wanting.

ANGALLIS. Flowers racemose; corolla longer than the calyx; capsule circumseissile.

DODECATHEON L. Perennial; leaves radical, oblong or spatulate. Flowers in an involucrate umbel. Calyx short, 5-parted, reflexed; corolla-lobes much longer, reflexed, tube short. Stamens united at the base, erect; anthers long, conically arranged.

D. meadia L. *Shooting Star*. Scape 1-2 feet high, glabrous as well as the leaves; flowers usually rose-color varying to white. Upland woods; May; frequent; Winneshiek, Delaware, Scott, Muscatine, and Johnson counties; reported from Fayette county.

ANDROSACE L. Small stemless tufted annuals, with umbellate flowers; calyx 5-cleft, with a short tube; corolla white, shorter than the calyx, funnel-form, 5-parted, constricted in the throat. Stamens and style included; capsule 5-valved, globular.

A. occidentalis Pursh. Stem 1-3 inches high; leaves spatulate to oblong, entire; plants minutely canescent. Gravelly banks; April-May; Johnson and Linn counties, reported from Scott county.

STEIRONEMA Raf. Perennials. Leaves opposite or whorled, entire, numerous. Flowers yellow, peduncled, axillary; calyx 5-parted; corolla rotate, deeply 5-parted, tube obsolete, sinuses rounded; petals short-pointed. Stamens 5, scarcely united at the base, alternate with 5 sterile ones or stam-

nodia, inserted at the base of the corolla; anthers linear; capsule 5-10-valved, 10-20-seeded.

S. ciliatum (L.) Raf. Stem erect, 4-angled, simple; leaves long-petioled, lanceolate-ovate, tapering to a sharp point, base cordate, petiole and frequently the margins of the leaf ciliate; corolla longer than the calyx. Thickets; June-August; common.

S. lanceolatum (Walt.) Gray. Erect; 10-24 inches high, leaves lanceolate to linear, on short margined petioles or nearly sessile, very variable. Wet grounds; June-August; frequent; Allamakee, Fayette, Delaware, Louisa, Johnson, Linn, Decatur, Kinggold, Story, Calhoun, and Kossuth counties; reported from Lyon and Emmet counties.

S. longifolium Gray. Stem erect, slender, 4-angled; leaves sessile, opposite or whorled, very narrow, linear, margins revolute, the lower oblong or spatulate; river bottoms; June-July; Winnesheik, Fayette, Story, Cerro-Gordo, and Dallas counties; reported from Scott county. (*S. quadriflorum* (Sims) Hitchcock).

LYSIMACHIA L. Similar to the preceding genus. Leaves glandular-dotted, sessile. Staminodia present or wanting. Filaments united at the base; anthers oval or oblong.

L. thyrsiflora L. Stem 1-2 feet high, simple; leaves narrowly lanceolate, the lower scale-like; inflorescence in thyrsoid pedunculate axillary clusters, shorter than the leaves, from the middle axils; petals linear, dotted, 5-7, with as many intervening teeth; stamens exserted. Swamps; May-July; infrequent; Emmet, Fayette, and Linn counties; reported from Muscatine and Story counties. (*Naumburgia thyrsiflora* (L.) Duby).

L. stricta Ait. Stem 1-2 feet high, 4-angled, at length branched; leaves usually opposite, lanceolate, tapering both ways; flowers in a terminal raceme, yellow; corolla with purple streaks and unarmed sinuses; axils often bulblet bearing. Swamps; June-August; rare; Linn county, reported from Fayette county. (*L. terrestris* (L.) B. S. P.)

ANAGALLIS L. Ours a diffuse annual, with opposite sessile entire leaves, and axillary peduncled flowers. Calyx 5-parted, the lobes subulate, spreading. Corolla rotate, 5-parted. Stamens 5, inserted on the base of the corolla; filaments hairy.

A. arvensis L. Stem 4-12 inches long, glabrous, branched; leaves black-dotted beneath, membranous; peduncles longer than the leaves, at length recurved; corolla scarlet with a purple center, the segments crenate and glandular-ciliate. Waste places; May-August; reported from Lee county.

EBENACEAE Vent. EBONY FAMILY.

Trees or shrubs, destitute of milky juice, with alternate entire exstipulate leaves, and dioecious polygamous or rarely perfect flowers. Calyx persistent, 3-6-lobed, free from the ovary. Corolla 3-6-cleft, deciduous. Stamens two or three times the number of the lobes of the corolla, usually some imperfect ones in the pistillate flowers. Ovary several-celled, with 1-3 pendulous ovules in each cell. Fruit a berry. Represented by the genus **DIOSPYROS** L.

D. virginiana L. *Persemon*. A small tree, ordinarily 10-30 feet high; wood hard, tough, blackish; leaves ovate or oval, acuminate, at first pubescent, becoming glabrous, petioled; flowers mostly 4-parted, cymose, racemose or solitary; corolla pale greenish yellow; stamens about 16 in the sterile

flowers and 8 or fewer in the pistillate flowers; fruit globose, about one inch in diameter, reddish yellow, ripe after frost, edible; seeds 6-8, large, dark purple. Woods; May-June; reported from southeastern Iowa.

OLEACEAE *Lindl.* OLIVE FAMILY.

Trees or shrubs. Leaves opposite, simple or compound. Calyx and corolla usually 4-cleft, sometimes wanting. Stamens 2. Ovary free, 2-celled, with 2 ovules in each cell.

FRAXINUS. Leaves pinnate; flowers dioecious; fruit a samara.

SYRINGA. Leaves simple; flowers complete; fruit a capsule.

FRAXINUS L. *Ash.* Flowers dioecious, racemose or paniced, axillary, from second year's growth. Calyx diminutive or wanting, entire or 4-cleft. Corolla of 2-4 petals or wanting. Anthers linear or oblong. Style 1, stigma 2-cleft. Fruit a samara.

* Lateral leaflets stalked; calyx small, persistent.

† Body of the samara terete or nearly so, the wing mostly terminal.

F. americana L. *White Ash.* A large tree; leaflets 5-9, ovate or lanceolate, acuminate, obscurely serrate, smooth or pubescent on the veins beneath, petioles, petiolules and branchlets glabrous; body of the fruit terete, half as long as the wing, marginless below, wing rising abruptly above, varying in outline from lanceolate to linear. Along streams; April-May; frequent.

F. viridis Mx. *Green Ash.* A smaller tree, leaflets 5-9, ovate or lanceolate, taper-pointed, serrate, bright green below, petioles, petiolules, and branchlets glabrous; body of the fruit slender, as long as the wing, tapering; wing decurrent, spatulate. Woods; April-May; frequent. (*F. lanceolata* Bork.)

F. pubescens Lam. *Red Ash.* Branches, petioles, petiolules, rachis, and lower surfaces of the leaves velvety-pubescent; leaflets 5-9, ovate, ovate-lanceolate or oblong, acuminate, entire or denticulate; body of the fruit linear, wing linear or spatulate, decurrent. Creek bottoms; April-May; reported from Muscatine county. (*F. pennsylvanica* Marsh.)

† † Body of the samara flat, winged all around.

F. quadrangulata Mx. *Blue Ash.* Branchlets 4-angular; leaflets 7-11, glabrous, ovate, lanceolate, or oblong, acuminate, base narrowed or rounded, serrate or serrulate; samara narrowly oblong or cuneate, wing usually notched above, decurrent around the body. Reported from Fayette county.

* * Lateral leaflets sessile; calyx wanting; samara winged all around.

F. sambucifolia Lam. *Black Ash.* Leaflets 7-11, sessile, oblong-lanceolate, tapering, serrate; fruit oblong or linear-oblong, ends equal. Along streams; April-May; infrequent; reported from Muscatine and Story counties. (*F. nigra* Marsh.)

SYRINGA L. A shrub, with opposite entire deciduous leaves, and complete flowers in terminal panicles or thyrses. Calyx 4-toothed, persistent. Corolla 4-lobed. Stamens 2. Ovary 2-celled, with 2 pendulous ovules in each cell; style elongated; stigma 2-cleft. Capsule oblong, 2-valved.

S. vulgaris L. *Lilac.* Run wild along the railway in Dubuque county.

APOCYNACEAE *Lindl.* DOGBANE FAMILY.

Perennial herbs, with milky juice, opposite leaves, and regular 5-parted flowers. Calyx persistent. Lobes of the corolla twisted in the bud. Stamens 5, inserted on the corolla; filaments distinct, pollen granular. Ovaries 2, superior; stigmas united. Fruit a follicle.

APOCYNUM L. Bark fibrous. Leaves mucronate-pointed. Calyx 5-parted. Corolla campanulate, 5-cleft. Stamens included, attached to the base of the corolla; anthers sagittate, longer than the filaments. Follicles separate, slender; seeds with a tuft of silky hairs at the apex.

A. ondrosaemifolium L. *Dogbane*. Stem 2-3 feet high, mostly glabrous branches divergent; leaves ovate, downy beneath, short-petioled; flowers in spreading cymes, terminal or lateral; corolla rose red, tube longer than the calyx. Fields and waste places; June-July; frequent throughout the state.

A. cannabinum L. *Indian Hemp*. Stem 2-4 feet high, glabrous to soft-pubescent; branches ascending; leaves sessile, oval to oblong, base somewhat cordate; cymes terminal; corolla greenish white, tube about the length of the calyx-lobes. Rich soil; July-August; frequent.

A. pubescens R. Br. Whole plant densely velvety-pubescent; leaves oval to elliptic, obtuse or acute, mucronate; cymes dense. Reported from Blackhawk county by Arthur. According to Britton and Brown this species was collected by Dr. C. C. Parry in Polk county in the year 1867.

ASCLEPIADACEAE *Lindl.* MILKWEED FAMILY.

Herbs, usually with milky juice, and opposite, whorled or scattered, entire exstipulate leaves. Flowers in some form of an umbel, regular, parts in 5's, sepals and petals valvate in the bud. Stamens 5, adhering to and covering the 2 stigmas.

ASCLEPIAS. Hoods provided with horns.

ACERATES. Hoods destitute of horns.

ASCLEPIAS L. MILKWEED. Perennials. Calyx persistent, 5-parted, reflexed. Corolla 5-parted, deciduous, valvate in the bud, reflexed. Crown made up of 5-hooded bodies, each with an incurved horn. Stamens inserted on the base of the corolla; anthers consolidated with the stigma, tipped with a membranaceous appendage, 2-celled, each containing a suspended waxy pollen mass, the pollinia, those of each anther forming pairs. Ovaries 2, developing into 1 or 2 follicles. Seeds flat, with a tuft of silky hairs at one end.

* Leaves opposite or alternate; corolla and corona orange.

A. tuberosa L. *Butterfly-weed*. Root tuberous; stem 1-2 feet high; juice not milky; roughish-hairy, leafy, branching near the top; leaves alternate, sessile or short-petioled, linear or lance-oblong; umbels many, erect, corymbed; flowers scarlet. Fields; June-July; common.

A. decumbens L. Stems decumbent, 2-3 feet long, hirsute-pubescent; leaves oblong or elliptic, obtuse, short-petioled or sessile, mostly opposite; umbels from the upper axils; corolla dark orange; follicles slender, erect. Fields; June-August; infrequent; reported from Story county. (*A. tuberosa* var. *decumbens* Pursh.)

* * Leaves opposite; corolla bright red or purple.

A. purpurascens L. *Purple M.* Stem 2-3 feet high, simple, smooth; leaves opposite, short-petioled, ovate or elliptical, short-pointed, short-pubescent beneath; umbels solitary, long-peduncled, axillary, pedicels shorter; flowers long, dark purple. Prairies and thickets; June-August; infrequent; Johnson, Henry, Appanoose, Decatur, Ringgold, Union, and Eminet counties; reported from Scott, Muscatine and Story counties.

A. incarnata L. *Swamp M.* Stem 2-5 feet high, mostly smooth; leaves

lanceolate, pointed, short-petioled, base obscurely heart-shaped; flowers small, rose purple. Wet places; July-September; common.

* * * Leaves opposite or verticillate; corolla white, greenish, yellowish or purplish.

† Leaves varying from ovate or oblong to obovate or orbicular.

‡ Leaves short-petioled or sessile, clasping; plants mostly glabrous.

A. sullivantii Engl. Tall, smooth; leaves ovate-oblong or oblong, base somewhat heart-shaped, nearly sessile, smooth on both sides; hoods obovate; follicles spiny on or toward the beak. Moist soil; July-August; frequent; Emmet, Muscatine, Jefferson, Appanoose, Decatur, Taylor, Page, Calhoun, Hancock, Cerro Gordo, and Shelby counties; reported from Fayette and Story counties.

A. obtusifolia Mx. Stem 2-3 feet high, smooth; leaves opposite, sessile, transversely veined, waxy, oblong to oblong-ovate, mucronate, sessile, subcordate; umbel on a long naked peduncle; flowers reddish green. Fields; May-September; infrequent; Johnson, Linn, Union, Adams, Montgomery, and Shelby counties.

A. meadli Torr. Stem simple, 1-2 feet high, smooth; leaves sessile, ovate or oblong-ovate, pointed or obtuse; peduncle about twice the length of the leaves; pedicels about an inch long; flowers greenish white. Dry soil; May-June; rare; Decatur and Adams counties.

‡‡ Leaves petioled; plants glabrous

A. phytolaccoides Pursh. *Poke M.* Stem 3-5 feet high, simple, smooth; leaves broadly ovate, tapering both ways, petioled, opposite, mostly smooth beneath; umbels several, axillary; peduncles 2-3 inches long; pedicels almost as long, very slender, drooping; flowers 10-20 in an umbel, greenish; hoods truncate, white, horns exserted. Woods, thickets; June-July; infrequent Winneshiek and Johnson counties; reported from Fayette, Scott, and Muscatine counties. (*A. exaltata* (L.) Muhl.)

A. quadrifolia Jacq. Stem 1-2 feet high, slender, simple; leaves ovate to lanceolate, thin, somewhat pubescent on the veins beneath, acute or acuminate, petioled, the upper and lower opposite, the middle verticillate in 4's; corolla pink or whitish; hoods white; follicles erect, glabrous. Woods; May-July; infrequent; Muscatine, Johnson, Henry, and Lee counties.

‡‡‡ The lower surfaces of the leaves and often the whole plant canescent or tomentose.

§ Follicles with soft spinose processes, tomentose.

A. cornuti Decaisne. Common M. Stem 2-4 feet high, short-pubescent; leaves short-petioled, oval or oblong, large, downy beneath, longer than the umbels; flowers varying from dull purple to white; follicles spiny, tomentose. Fields and waste places; June-July; common. (*A. syriaca* L.)

A. speciosa Torr. Whole plant white-tomentose or canescent or glabrate below; stem 1-3 feet high, simple; leaves broadly ovate or oval, obtuse and cuspidate or acute at the apex, base subcordate, rounded or narrowed, petioled; corolla purple-green; hoods elongated, lanceolate, with 2 blunt teeth below; horns short, inflexed; follicles erect or spreading, densely woolly, covered with soft spinose processes. Moist soil; May-July; infrequent; Emmet and Hancock counties.

§§ Follicles with no spinose processes, glabrous or pubescent.

A. ovalifolia Decaisne. Stem 1-2 feet high, downy; leaves ovate, acutish, short-petioled; peduncle very short, pedicels longer; hoods yellow, horns included; corolla-lobes greenish white tinged with purple. Prairies; June-

July; rare; Emmet county; reported from Fayette, Story, and Woodbury counties.

† † Leaves varying from narrowly lanceolate to linear.

A. verticillata L. Stems simple, 2-3 feet high; leaves 3-6 in a whorl, sometimes scattered, sessile, very narrow, linear, margins revolute; umbels small, lateral or terminal; corolla greenish white; horus exserted; follicles slender, erect, glabrous. Dry wooded hills; July-August; common.

ACERATES Ell. GREEN MILKWEEDS. Perennials. Hoods without horns. Flowers greenish, in close umbels.

A. longifolia Ell. Stem 2-3 feet high, roughish-pubescent, leafy; leaves 3-7 inches long, linear, sessile, scattered; umbels lateral, peduncle and pedicels about equal in length. Fields and prairies; July-September; frequent. (*A. floridana* (Lam.) Hitchcock).

A. viridiflora (Raf.) Eaton. Stem 1-2 feet high, whitish-pubescent; leaves opposite, oval, oblong or ovate, short-petioled or sessile; umbels lateral, short-peduncled or sessile. Prairies; June-September; frequent. Variable; one of its forms, the variety **LANCEOLATA** Gray, has lanceolate leaves and is found with the typical form.

A. lanuginosa Decaisne. Low, hairy; umbel solitary, terminal. Reported from Plymouth county.

GENTIANACEAE Dumort. GENTIAN FAMILY.

Herbs, with a watery bitter juice, opposite, rarely alternate, simple, sessile entire exstipulate leaves, and regular, solitary or cymose flowers. Stamens as many as the lobes of the corolla, and alternate with them. Ovary superior, 1-celled, with 2 parietal placentae. Fruit a 2-valved many-seeded capsule.

GENTIANA L. GENTIAN. Leaves simple, sessile, opposite. Calyx 4-5-cleft, persistent. Corolla 4-5-cleft, funnel-form or campanulate, sinuses usually appendaged. Stamens inserted on the corolla. Stigmas 2, sessile or nearly so.

* Corolla with no plait or teeth in the sinuses.

G. crinita Froel. Fringed G. Annual, 1-2 feet high; stem and branches erect, smooth; leaves lanceolate, acute, base somewhat cordate; flowers blue, large, on long terminal peduncles, mostly in 4's; corolla-tube as long as the ovate acute calyx-lobes; corolla-lobes obovate, fringed. Wet places; September-October; infrequent; Muscatine, Johnson, Linn, and Chickasaw counties; reported from Fayette, Story, and Hamilton counties.

G. quinquefolia L. Annual; stem 1-2 feet high, 4-angled, branched; leaves ovate-lanceolate, partly clasping; flowers smaller than those of the preceding species, peduncled, usually 5 in a cluster, pale blue, corolla-lobes bristle pointed. The type has the calyx-lobes very small, lance-linear. The common form with us is the variety **OXIDENTALIS** Gray, which has the calyx-lobes leaf-like, half as long as the corolla. Moist soil, woods; August-October; Winneshiek, Johnson, Jefferson, Henry, and Hancock counties; reported from Fayette, Muscatine, Story, and Emmet counties.

* * Corolla with toothed or lobed plait in the sinuses.

G. puberula Mx. Stem about one foot high, roughish, leafy; leaves linear-lanceolate, thick; flowers clustered; calyx-lobes narrowly lanceolate; corolla blue, 2 or 3 times the length of the calyx, the lobes ovate, spreading; sinuses of the corolla with cut-toothed appendages. Prairies; August-September;

frequent; Winneshiek, Floyd, Muscatine, Johnson, Jefferson, Decatur, Winnebago, and Emmet counties; reported from Fayette, Story, Plymouth, and Woodbury counties.

G. andrewsii Griseb. *Closed G.* Stem simple, smooth; leaves ovate-lanceolate to lanceolate, tapering to the apex and frequently more or less toward the base; calyx-lobes ovate to lanceolate, shorter than the tube; corolla one and one-half inches long, inflated, bluish, folds in the sinuses fringed and as long as the segments. Moist woods; August-October; frequent; Delaware, Muscatine, Johnson, Linn, Appanoose, Decatur, Story, Winnebago, and Emmet counties; reported from Fayette and Woodbury counties.

G. flavidia Gray. Stem simple, 1-2 feet high; leaves ovate-lanceolate, tapering, base somewhat cordate, partly clasping; flowers in a terminal involucrate cluster, sessile; calyx-lobes ovate, short; corolla white, somewhat inflated, lobes longer than the toothed appendages. Moist soil, woods; August-October; infrequent; Winneshiek, Fayette, Delaware, Muscatine, Johnson, Jefferson, Decatur, and Taylor counties; reported from Scott and Story counties. (*G. alba* of Gray's Manual).

MENYANTHACEAE *G. Don.* BUCKBEAN FAMILY.

Ours a perennial marsh herb, with a thickish creeping rootstock, basal or alternate 3-foliate leaves, and regular perfect flowers. Calyx 5-parted, persistent, inferior. Corolla 5-lobed or 5-cleft. Stamens 5, borne on the corolla, and alternate with its lobes; filaments short; pollen-grains 3-angled. Ovary 1-celled, with 2 placentae. Fruit a capsule. Represented in our flora by the genus *MENYANTHES* L.

M. trifoliata L. *Buckbean.* Rootstock 1 foot long or less, thick, scaly; leaves long-petioled; leaflets oblong or obovate, entire, obtuse, base narrowed and sessile; raceme borne on a long naked peduncle, from the rootstock; corolla white or purplish, white-bearded inside; stamens usually included and the style exserted. Marshes; May-July; infrequent; Emmet and Cerro Gordo counties.

POLEMONIACEAE *D. C.* PHLOX FAMILY.

Herbs, with alternate or opposite entire leaves, and regular showy perfect flowers. Calyx and corolla 5-parted. Stamens 5, inserted on the long tube of the corolla, alternate with the lobes. Ovary 3-celled; stigmas 3, linear. Fruit a 3-celled, 3-valved loculicidal capsule.

PHLOX. Leaves opposite, entire.

POLEMONIUM. Leaves alternate, pinnate or pinnately parted.

COLLOMIA. Leaves alternate, entire.

PHLOX L. Leaves opposite, sessile, entire. Calyx narrow, deeply 5-cleft. Corolla salver-formed, tube long, limb spreading. Stamens 5, unequally inserted, included. Cells of the capsule 1-seeded. Flowers cymose, bracted, terminal or in the upper axils. Perennials.

P. paniculata L. Stem 3-4 feet high, smooth; leaves ovate-lanceolate, tapering both ways; panicle large, many-flowered; calyx-teeth awn-pointed; corolla pink-purple varying to white. Cultivated, occasionally escaped; June-August; Johnson county; reported from Fayette county.

P. maculata L. Stem 2-3 feet high, slender, smooth, purple spotted; leaves lanceolate, the tapering base cordate; flowers in a narrow panicle;

calyx-teeth triangular, much shorter than the tube; corolla purple. Fields; June-August; Jones, Johnson, Linn, Cerro Gordo, and Hancock counties; reported from Fayette and Story counties.

P. pilosa L. Stem 12-18 inches high, hairy or pubescent; leaves lanceolate to linear, gradually tapering to an acute apex; calyx-teeth bristle-pointed about half the length of the corolla-tube; corolla pink or pinkish, lobes obovate, entire. Prairie soil; May; common.

P. divaricata L. Stem 6-18 inches high, from a more or less decumbent base, pubescent; leaves ovate to oblong-lanceolate; cymes corymbose-paniculate, loosely spreading; calyx-teeth slender, half the length of the corolla-tube; corolla pale blue or lilac, varying to white, lobes obovate, notched or rounded. Moist woods; April-May; common.

P. bifida Beck. Low; stem 5-6 inches high, pubescent; leaves linear to narrowly lanceolate; flowers few, on slender peduncles; calyx-teeth about as long as the tube; corolla purple, lobes cleft to the middle, divisions linear-oblong. May; sandy soil along Cedar river, Muscatine county; reported from Benton county.

P. subulata L. *Ground or Moss Pink.* Pubescent or at length glabrate, evergreen; stems tufted, much-branched, diffuse, forming mats; leaves varying from narrowly oblong to linear-subulate, acute or acuminate, rigid, ciliate, usually fascicled; flowers cymose, pink, purple, or white; corolla-lobes cuneate-obcordate, rarely entire. Sandy or dry soil; April-May; an escape from gardens and cemeteries; Page county; reported from Fayette county.

POLEMONIUM L. Perennials, with alternate pinnate leaves, and cymose-paniculate flowers. Calyx campanulate, leaf-like, 5-cleft. Stamens 5, equally inserted near the base of the corolla, declined, base of the filaments hairy.

P. reptans L. Stem 6-14 inches high, weak, branched, spreading; smooth to minutely pubescent; leaflets 7-15, varying from ovate-lanceolate to oblong; flowers corymbose, nodding; calyx somewhat inflated in fruit; corolla light blue; stamens and style included. Rich woods; May-June; frequent; Winneshiek; Allamakee, Scott, Muscatine, Johnson, Henry, Decatur, Mahaska, and Cerro Gordo counties; reported from Fayette, Story, and Cherokee counties.

COLLOMIA Nutt. Annual. Leaves alternate, entire. Flowers glomerate, mostly terminal, with leaf-like bracts. Stamens unequally inserted on the slender funneliform corolla.

C. linearis Nutt. Stem 6-12 inches high, minutely pubescent; at length much-branched; leaves linear or oblong-lanceolate; corolla slender, varying from purplish to white, limb small. Dry soil; May-August; infrequent; Decatur and Lyon counties. (*Gilia linearis* Gray).

HYDROPHYLACEAE Lindl. WATER-LEAF FAMILY.

Herbs, with alternate or basal, lobed or pinnate leaves, and perfect regular blue or white, solitary, cymose or racemose flowers. Calyx 5-cleft, persistent, free, often appendaged. Corolla 5-lobed. Stamens 5, inserted on the corolla-tube. Style deeply 2-cleft. Ovary entire, 1-celled, rarely 2-celled, with 2-parietal placentae.

HYDROPHYLLUM. Stamens exserted; calyx not enlarged in fruit.

ELLISIA. Stamens included; calyx enlarged in fruit.

HYDROPHYLLUM L. WATER-LEAF. Perennials. Leaves cut-toothed, mostly pinnate. Flower clusters coiled when young. Calyx 5-parted. Corolla campanulate, 5-cleft, nectariferous down the inside of the tube. Stamens

usually exserted, anthers linear. Ovary 1-celled, hairy. Capsule 1-4-seeded.

* *Calyx not at all or scarcely appendaged in the sinuses.*

H. virginicum L. Stem 12-20 inches high, sparingly pubescent, becoming glabrate; leaves pinnatifid, leaflets ovate or oblong, pointed, cut-toothed, often incised, the upper confluent; peduncles longer than the petioles, forked; flowers pale blue, in a roundish cluster; calyx not appendaged, its lobes linear, ciliate; stamens and style exserted. Rich woods; May-June; common.

H. macrophyllum Nutt. Stem hairy; leaves ovate-oblong, pinnatifid, cut-toothed; peduncles shorter than the petioles; flowers white, in dense globose cymes; calyx-lobes lanceolate, filaments exserted. Rich woods; June-July; rare; Johnson county; reported from Scott county.

** *Calyx with short reflexed appendages in the sinuses.*

H. appendiculatum Mx. Stem 1-2 feet high, hairy, weak; leaves broadly ovate, base rounded, long-petioled, palmately 5-lobed, lowest pinnately divided; lobes pointed, widely toothed; calyx with short appendages, its lobes triangular-lanceolate; stamens slightly if at all exserted; flowers blue. Rich woods, near the base of cliffs; May-June; common in the eastern counties, rarer westward; Winneshiek, Jackson, Muscatine, Des Moines, Lee, Henry, Johnson, and Boone counties; reported from Fayette county.

ELLISIA L. Delicate annual, at length much-branched. Leaves pinnately parted, divisions linear-oblong or lanceolate, incised or toothed. Flowers solitary, whitish. Calyx 5-parted, becoming large and foliaceous in fruit, not appendaged. Corolla narrowly campanulate, about the length of the calyx, tube with 5 small appendages within. Stamens included.

E. nyctelea L. Stem weak, somewhat hairy; leaves petioled, lower opposite, upper alternate; peduncles slender, axillary or opposite the leaves. Rich soil; May-July; fields and woods; common. (*Macrocalyx nyctelea* (L.) Kuntze).

BORAGINACEAE. *Lindl.* BORAGE FAMILY.

Annual biennial or perennial herbs, with round stems, and alternate entire exstipulate leaves. Calyx 5-parted. Corolla 5-lobed, imbricated in the bul. convolute in *Myosotis*. Stamens 5, inserted on the tube of the corolla. Style 1; stigmas 1 or 2. Ovary deeply 4-lobed, in ours separating into 4 one-seeded nutlets, style rising from their midst. Flowers in slender bracted or bractless racemes.

* *Nutlets armed with prickles.*

* **CYNOGLOSSUM.** Corolla funnelform; nutlets attached near the apex, much produced backwards.

ECHINOSPERMUM. Corolla salverform; nutlets erect or ascending.

** *Nutlets unarmed.*

MERTENSIA. Corolla trumpet-shaped, purplish blue.

MYROTIS. Corolla tubular or salverform, lobes rounded, throat closed.

LITHOSPERMUM. Corolla funnelform or salverform, yellow, limb spreading, throat naked or appendaged.

ONOSMODIUM. Corolla tubular, hirsute, whitish, erect, unappendaged.

ECHIUM. Flowers irregular; stamens exserted.

CYNOGLOSSUM L. Coarse strong-scented herbs, with alternate entire leaves, and blue or white flowers. Calyx 5-parted. Corolla funnelform, about equalling the calyx, throat closed by convex scales, lobes rounded. Nutlets depressed, attached near the apex to the base of the style, the 4-nut-

lets giving a broad pyramidal outline, outer surface covered with short hooked prickles.

C. officinale L. *Hound's Tongue*. Biennial; stem 1-2 feet high, silky-pubescent; lower leaves petioled, upper sessile, oblong-lanceolate; flowers in slender panicled racemes, bracted only at the base; corolla reddish-purple; nutlets rather flattened on the broad upper surface. Pastures and waste places; June-July; infrequent; Allamakee, Scott, Muscatine, Des Moines, Henry, Lee, and Fremont counties; reported from Fayette county.

ECHINOSPERMUM Lehm. Annual biennial or perennial herbs, more or less hirsute or canescent, with bracted racemes, and small blue or white flowers. Calyx 5-parted. Corolla short, salverform, lobes obtuse, imbricated in the bud, throat closed by 5 short concave scales. Stamens included. Nutlets erect, smooth on their inner faces, armed on the back with 1-3 rows of barbed prickles.

* *Racemes bracted; fruiting pedicels erect or spreading.*

E. lappula Lehm. Annual; stem 1-2 feet high, erect, strict, bristly-hairy; leaves linear, lanceolate or the lower spatulate; corolla blue, longer than the calyx; nutlets with two rows of spines on the margin or scattered over the entire surface. Waste places; June-August; frequent. (*Lappula lappula* (L.) Karst).

E. texanum Scheele. Annual; similar to the preceding, 6-20 inches high, branched; leaves linear or linear-oblong, obtuse; nutlets with a single row of spines on the margins, papillose-tuberculate on the back. Dry soil; May-August; infrequent; Winnesheik, Johnson, and Woodbury counties. (*Lappula texana* (Scheele) Britton. *E. redowskii occidentalis* Watson, of Gray's Manual).

* * *Racemes bracted at the base; fruiting pedicels deflexed.*

E. virginicum Lehm. *Beggar's Lice*. Biennial; stem 2-4 feet high, much-branched, rough-pubescent; leaves large, oval or ovate-oblong, acuminate, narrowed to the base; racemes slender, widely diverging; flowers small, white; nutlets armed all over the back with double-barbed prickles. Dry soil, waste places; June-September; common. (*Lappula virginiana* (L.) Greene).

E. americanum (Gray). Annual; stem 4-10 inches high, hairy; leaves linear-oblong to lanceolate; flowers small, blue, in a lax raceme; nutlets pyramidal, prickles only on the margins. Dry soil; May-August; infrequent; reported from Iowa.

MYOSOTUS L. Flowers small, in naked racemes, sometimes bracted at the base. Calyx 5-cleft. Corolla tubular or salverform, convolute in the bud, the tube about the length of the calyx, the throat closed by 5 short concave appendages. Stamens included. Nutlets ovate, smooth, compressed.

M. verna Nutt. Annual or biennial; stem 4-7 inches high, bristly-hairy; lower leaves spatulate-oblong, the upper obtuse; linear-oblong; raceme leafy at the base; calyx deeply 5-cleft, somewhat 2-lipped, hispid; corolla small, white, pedicels in fruit rather shorter than the calyx. Dry soil; May-July; infrequent; Muscatine, Johnson, and Linn counties; reported from Benton county. (*M. virginica* (L.) B. S. P.).

MERTENSIA Roth. Glabrous or pubescent perennials, with alternate leaves, and blue or purple flowers in cymes, panicles, or racemes. Calyx short, 5-cleft. Corolla-tube cylindrical, limb somewhat campanulate, 5-cleft, throat naked or with 5 small folds alternate with the stamens. Stamens in-

serted at the top of the tube, anthers oblong. Style filiform, long. Nutlets ovoid, smooth or wrinkled.

M. virginica (L.) DC. *Blue-bells. Lungwort. Virginia Cowslip.* Stem about one foot high, usually smooth; leaves thin, pale, entire, oval, oblong or obovate, obtuse, upper sessile, lower petioled, long; flowers in a corymbose raceme; corolla trumpet-shaped, much exceeding the calyx, blue or purplish blue, limb nearly entire, throat naked; filaments slender, exserted. Damp soil along streams; April-May; frequent; Winneshiek, Scott, Muscatine, Johnson, Des Moines, Van Buren, Page, and Polk counties; reported from Fayette and Story counties.

M. paniculata (Ait.) Don. Stem 1-2 feet high, erect, seabrous; leaves thin, ovate to ovate-lanceolate, taper-pointed, the upper sessile, the lower petioled; calyx-lobes lanceolate or linear; corolla usually 2-3 times the length of the calyx, 5-lobed, purple-blue, throat crested, filaments broad and short. Woods; June-August; infrequent; Winneshiek county.

LITHOSPERMUM L. Mostly perennials, with thickish descending roots, usually containing a red dye, sessile or short-petioled leaves, and blue, yellow or white flowers in leafy-bracted spikes or racemes. Calyx 5-parted or 5-cleft, the lobes narrow. Corolla funnelform or salverform, limb 5-lobed, throat open, appendages sometimes present. Anthers 5, included, oblong, nearly sessile. Nutlets 4, smooth, white, shining, or brown and wrinkled.

* *Corolla yellowish or white; its tube shorter than or only equalling the calyx.*

† *Nutlets brown, wrinkled and pitted.*

L. arvense L. Annual or biennial; stem 1-2 feet high, usually branched; leaves linear, linear-oblong or lanceolate; flowers sessile, in spikes; nutlets brown, wrinkled, pitted. Waste places; May-August; reported from Muscatine and Lee counties.

† † *Nutlets smooth, shining, wavy white.*

L. officinale L. *Gromwell.* Perennial; puberulent; stem 2-4 feet high, leafy, branched; leaves lanceolate or oblong-lanceolate, acute; flowers yellowish-white; nutlets white, ovoid. Waste places; May-August; reported from Fayette county.

* **L. latifolium** Mx. Perennial; stem erect, simple or branched, rough-pubescent; leaves ovate-lanceolate, tapering both ways, rough on the upper surface, soft-pubescent beneath; flowers small, pale yellow; corolla shorter than the calyx, throat with 5 appendages. Upland woods; May; infrequent; Winneshiek, Webster, Pottawattamie, and Shelby counties; reported from Fayette and Story counties.

* * *Corolla yellow, its tube longer than the calyx; nutlets white, smooth, shining.*

† *Corolla-tube not more than twice the length of the calyx.*

L. hirtum Lehm. *Hairy Puccoon.* Stem erect, 1-2 feet high, covered with stiff hairs; leaves lanceolate or linear, rough, obtuse; flowers peduncled, yellow; corolla twice the length of the calyx, woolly at the base inside. Sandy soil, woods; April-June; frequent; Winneshiek, Allamakee, Floyd, Johnson, Lyon, and Emmet counties; reported from Fayette, Scott, and Muscatine counties. (*L. gmelini* (Mx.) Hitchcock).

L. canescens (Mx.) Lehm. *Hoary Puccoon.* Erect, simple, 6-15 inches high, soft canescent; leaves obtuse, linear or linear-oblong; flowers orange-yellow, sessile; corolla-tube twice the length of the calyx, naked at the base inside. Fields and prairies; May-June; common; Winneshiek, Allamakee, Scott, Muscatine, Johnson, Henry, Decatur, Page, Pottawattamie, Calhoun.

and Shelby counties; reported from Fayette, Story, and Woodbury counties.

† † *Corolla-tube 2-4 times the length of the calyx.*

L. angustifolium Mx. Stem erect or suberect, 6-14 inches high, hoary; leaves linear; flowers of two kinds, pedicelled, the early ones showy; corolla-tube about one inch in length, cylindrical, the lobes 5, rounded, denticulate; the later flowers small, inconspicuous and with pale corollas. Dry or sandy soil, prairies; widely distributed, common in the western counties, infrequent in the eastern counties; Winneshiek, Fayette, Floyd, Delaware, Linn, Pottawattamie, Shelby, and Emmet counties; reported from Scott, Story, and Woodbury counties.

ONOSMODIUM Mx. Hirsute or hispid perennials, with alternate entire leaves, and greenish or greenish yellow flowers in spike-like one-sided racemes. Calyx 5-parted, segments linear. Corolla cylindrical, 5-lobed; anthers sessile, included, oblong-linear or arrow-shaped, mucronate. Style slender, much exserted. Fruit a bony nutlet, shining, ovoid.

O. molle Mx. Plant pale, soft hirsute; stem 1-2 feet high; leaves sessile, oblong-lanceolate, acutish, prominently veined; corolla about twice the length of the calyx, hirsute externally; nutlets ovoid-globose. Prairies and pastures: May-July; common in the western counties, infrequent eastward; Winneshiek, Allamakee, Webster, Johnson, Union, Adams, Montgomery, Page, Fremont, Pottawattamie, Shelby, Cerro Gordo, Lyon, and Dickinson counties; reported from Fayette, Scott, Muscatine, Story, and Woodbury counties. (*O. carolinianum* var. *molle* Gray.) The hirsuteness varies from short and soft to rather long and somewhat shaggy, and some forms closely resemble the next.

O. carolinianum (Lam.) DC. Similar to the preceding, usually taller, green, shaggy-hirsute; nutlets ovoid. Probably belongs to our flora.

ECHIUM L. A biennial bristly-hairy herb, with alternate sessile oblong linear-oblong or linear-lanceolate leaves, and rather large blue violet flowers in short leafy-bracted one-sided spikes. Calyx 5-parted. Corolla with a funnelform tube, the limb unequally 5-lobed. Stamens 5, inserted on the lower portion of the tube.

E. vulgare L. *Viper's Bugloss.* *Blueweed.* Reported from Story county.

CONVOLVULACEAE Vent. MORNING-GLORY FAMILY.

Trailing or twining herbs, with alternate, petioled, exstipulate leaves, and peduncled axillary flowers. Flowers showy, solitary or cymose; peduncles frequently 2-bracted. Calyx imbricated, of 5 sepals. Corolla monocarpalous, 5-plaited or 5-lobed, convolute in the bud. Stamens 5, alternate with the corolla-lobes, inserted on the corolla-tube. Ovary free, 2-celled, or sometimes apparently 4-celled. Capsule globular, 2-6-seeded.

CONVOLVULUS. Style undivided or 2-cleft; stigmas 2, linear or oblong.

IPOMOEA. Style undivided; stigma capitate or 2-3-lobed.

BREWERIA. Style 2-cleft; stigmas capitate.

CONVOLVULUS L. *BINDWEEED.* Corolla funnelform or campanulate, including the stamens. Style 1; stigmas 2, narrowly linear to ovate.

C. sepium L. Trailing or climbing extensively, glabrous or somewhat pubescent, leaves slender-petioled, triangular-sagittate, pointed, auricles angulately-lobed or entire; calyx with 2 ovate acute bracts below; corolla large, white or tinged with rose color. Rich soil, fields and thickets; June-August; common.

C. spithameus L. Stem simple erect or ascending, tomentose, 4-12 inches high; leaves short-petioled, oblong, with a somewhat sagittate or cordate base. Stigmas oval; bracts ovate. Dry soil; May-August; infrequent; Johnson county.

C. arvensis L. Mostly prostrate; leaves narrowly sagittate or hastate; calyx bractless; corolla small, pink or whitish; peduncles with 2 small bracts near the base; styles slender. Fields and waste places; May-September; infrequent; Muscatine, Henry, Decatur, Taylor, and Fremont counties; reported from Fayette and Scott counties.

IPOMOEA L. MORNING GLORY. Calyx of 5-sepals, outer sepals usually larger, no bracts at the base. Corolla funnelform to campanulate. Stamens included. Style undivided; stigma capitate.

* *Ovary 2-celled, stigma entire or 2-lobed.*

I. pandurata (L.) Meyer. Perennial; stems from a large tuber, trailing or twining, smooth; leaves cordate, acuminate; peduncles longer than the petioles, 1-5-flowered; sepals ovate, obtuse; corolla 2-3 inches long, white, purple inside. Dry soil, thickets and in fields; May-September; Winneshiek, Muscatine, Louisa, Johnson, Henry, Lee, Des Moines, Van Buren, Decatur, and Lyon counties.

I. lacunosa L. Annual, roots fibrous; glabrous, pubescent or hairy; peduncles 1-3-flowered, shorter than the petioles; sepals lanceolate, pointed, margins ciliate; corolla about one-half inch long, white, limb purple, 5-lobed. Moist soil; July-September; infrequent; along the Mississippi river; Muscatine county.

* * *Ovary 3-celled; stigmas 3.*

I. hederacea Jacq. Annual, hairy; leaves cordate, 3-lobed, lobes ovate, acute or acuminate, peduncles long, 1-3-flowered, sepals narrowly lanceolate, lower part hairy; corolla white, bluish or purple. Waste grounds; August-September; Johnson, Henry, and Lee counties; reported from Scott county.

I. purpurea (L.) Roth. Annual, stem, sepals and flowers similar to the preceding but leaves cordate, entire, acuminate. Escaped from cultivation; July-September; Johnson, Henry and Decatur counties; reported from Fayette, Scott, and Story counties.

BREWERIA R. Br. Perennials; for the most part similar to the two preceding genera. Style 2-cleft; stigmas capitate.

B. pickeringii (Curtis) Gray. Pubescent to glabrate; leaves linear-spatulate to narrowly linear, short-petioled or almost sessile; peduncles about the length of the leaves, with 1-3 small white flowers; bracts large, leaf-like; filaments united to or above the middle, exserted. Sandy soil, along the railway; June-August; Muscatine county.

CUSCUTACEAE *Dumort.* DODDER FAMILY.

Annuals, with dextrorsely twining whitish or yellow stems, minute alternate scales instead of leaves, and mostly 5-parted flowers. The young plants attach themselves to various herbs or shrubs by means of suckers, the root and lower portion soon perishing. Flowers mostly white, small, in cymose clusters. Calyx inferior, 5-cleft or 5-parted or of 5 distinct sepals. Corolla 5-cleft, with 5 fimbriate or crenulate scales in the tube. Stamens 5, alternate with the corolla-lobes, inserted above the scales, exserted or included. Ovary globose or oblong, 2-celled, 4-ovuled; styles 2, terminal, usually separate. Represented by the genus **CUSCUTA** L.

* *Calyx gamosepalous.*

† *Flowers nearly sessile; corolla persistent at the base of the capsule.*

C. arvensis Beyrich. Stems low, pale, slender; flowers small; calyx-lobes obtuse, those of the corolla acuminate; scales ovate, deeply fringed all around. Rare; growing on *Artemisia* and other herbs; July-August; Lyon, Emmet, and Decatur counties.

C. chlorocarpa Engelm. Stems low, coarse, orange-yellow, branching; flowers white, short-pedicelled or sessile; calyx and corolla with four or five acute lobes; scales usually wanting or small and 2-cleft, or of a few teeth. On *Polygonums* and various herbs; July-September; forms from Emmet, Johnson, Henry, and Muscatine counties have been referred to this species. (*C. polygonorum* Engelm.)

† † *Flowers pedicelled; corolla-lobes incurved.*

C. inflexa Engelm. Flowers pedicelled; calyx and corolla 4-5-parted, lobes of the corolla acute, erect, inflexed, crenulate; scales a few teeth; capsule brown, capped by the remains of the corolla. Thickets, on *Corylus*, etc.; rare; Decatur county; reported from Fayette, Poweshiek, and Story counties. (*C. cornuta* Engelm.)

† † † *Flowers pedicelled; corolla-lobes spreading.*

C. tenuiflora Engelm. Stems coarse, yellow, climbing high; flowers sometimes in 4's, in compound cymes, pedicels thick; calyx-lobes and corolla-lobes oblong, obtuse; scales included, fringed; styles longer than the ovary. Low grounds; July-August; frequent, on *Vernonia*, *Solidago*, *Xanthium*, *Salix*, *Urtica*, etc.; Emmet, Winnesiek, Johnson, and Decatur counties; reported from Fayette, Benton, Story, and Lee counties. (*C. cephalanthii* Engelm).

C. gronovii Willd. Flowers more or less densely panicled, 5-parted; corolla-tube campanulate, exceeding the calyx; lobes obtuse, entire, spreading; scales much fringed above, sparingly along the sides. Most soil; July-August; frequent; Story, Muscatine, and Lee counties; no doubt more generally distributed than our present information indicates.

* * *Calyx of 5 distinct sepals, subtended by similar bracts.*

C. glomerata Choisy. Flowers sessile, white, in dense rope-like twists; the stems slender, decaying early between the flower masses; calyx of 5 distinct sepals, subtended by oblong scarious imbricated bracts; corolla-lobes obtuse, oblong-lanceolate, recurved or spreading. Low grounds, mostly on *Compositae*; July-September; frequent; Winnesiek, Allamakee, Jackson, Johnson, Muscatine, Henry, Decatur, Taylor, Emmet, Dickinson, and Lyon counties; reported from Fayette, Scott, Story, and Woodbury counties. (*C. paradoxum* Raf.)

SOLANACEAE Pers. POTATO FAMILY.

Herbs or shrubs, with watery juice, alternate, rarely opposite, exstipulate leaves, and regular 5-parted flowers. Calyx persistent. Corolla imbricate or valvate in the bud. Stamens 5, equal, inserted on the corolla and alternate with its lobes; anthers 2-celled. Style and stigma 1. Fruit a capsule or a berry, usually 2-celled, rarely 3-5-celled. An order with rank-scented leaves and poisonous or narcotic fruits; a few as the tomato, potato, etc., are edible.

* *Fruit a berry.*

SOLANUM. Anthers connivent, opening apically by two pores.

PHYSALIS. Anthers separate; calyx becoming inflated; ovary 2-celled.

NICANDRA. Anthers separate; calyx much inflated in fruit; ovary 3-5-celled.

* * *Fruit a nearly dry berry; calyx unaltered.*

LYCIUM. Shrubby; berry small, 2-celled.

* * * *Fruit a spiny capsule.*

DATURA. Flowers large; stamens included.

SOLANUM L. Corolla rotate, with a short tube, 5-cleft. Anthers erect, longer than the filaments, connivent or connate around the style, opening apically by two pores or chinks. Fruit a 2-celled berry.

* *Glabrous or pubescent, not prickly.*

S. nigrum L. *Nightshade.* Annual, rarely perennial; stem 1-2 feet high, erect or spreading, smoothish; leaves ovate, thin, angulately toothed; flowers small, white, in drooping axillary umbel-like clusters; peduncle long and slender; berry globose, black. Fields and waste places; July-September; common.

S. tuberosum L. The common potato, occasionally an escape, but not persistent.

S. triflorum Nutt. Annual, glabrous or sparingly pubescent; stem 1-3 feet high, branched; leaves pinnatifid; peduncles with 1-3 small white flowers; berry globose, green. Reported from Fayette county.

* * *Stellate-pubescent and prickly plants.*

† *Berry smooth, not covered by the calyx.*

S. carolinense L. *Horse-Nettle.* Perennial, with stellate-pubescence and scattered yellow prickles on the stem and veins; leaves angulately lobed; flowers white, racemose; anthers large, equal; berry spheroidal, naked, yellow. Waste grounds, fields; June-August; common in the west counties, spreading eastward and frequent in many localities.

S. torreyi Gray. Perennial, hoary with stellate-pubescence, prickly; leaves ovate sinuately 5-7-lobed, the lobes entire or undulate, obtuse; flowers showy; corolla violet; berry globose, yellow. Reported from southern Iowa.

† † *Berry covered by the spiny calyx.*

S. rostratum Dunal. *Sand Bur.* Annual; pubescence stellate; stem and veins thickly beset with long prickles; leaves sinuately lobed or pinnatifid; flowers yellow; calyx prickly, enclosing the fruit; stamens and style declined, lower stamen longer. Waste places; May-September; frequent in the west counties, infrequent eastward, spreading. This species has been found in fifty-one counties. A noxious weed of the worst type.

S. heterodoxum Dunal. Annual, glandular-pubescent, somewhat stellate-pubescent on the leaves, armed with yellow subulate prickles; leaves bipinnatifid; flowers violet; four of the stamens yellow, the fifth violet and longer. Reported from Fayette county.

PHYSALIS L. *GROUND CHERRY.* Annual or perennial herbs, with entire or sinuately toothed leaves. Calyx 5-cleft, persistent, reticulated, at length inflated and enclosing the fruit. Corolla yellowish, campanulate-rotate, tube short, obscurely 5-lobed. Stamens 5, connivent; anthers opening lengthwise. Peduncles axillary, 1-flowered. Fruit a 2-celled berry.

* *Annuals with fibrous roots, perennial in P. philadelphica.*

† *Plants more or less pubescent; fruiting calyx sunken at the base.*

P. pubescens L. Stem 1-2 feet high, branched, at length decumbent, pubescent, sharply angled; leaves ovate or cordate, varying from entire to angulately-toothed; calyx 5-angled; corolla spotted; anthers purplish. Damp soil; July-September; frequent.

P. pruinosa L. Stem stout, usually erect, hairy, obtusely angled; leaves ovate, cordate, usually oblique at the base, more or less deeply sinuately toothed; fruiting calyx rounded; anthers yellow or tinged with purple. Fields; July-September; reported from Iowa; probably confused with the preceding.

† † *Plants glabrous; fruiting calyx not sunken at the base.*

P. angulata L. Stem erect, 1-3 feet high, glabrous, angular; leaves ovate, with long acuminate teeth, thin, base more or less cuneate; anthers somewhat purplish. Fields; July-September; infrequent; Fremont county; forms from Johnson and Taylor counties have been referred to this species.

P. philadelphica Lam. Annual or perennial; stem 2-5 feet high, angled, branched, glabrous, or slightly pubescent; leaves ovate or ovate-lanceolate, acuminate, entire or repand-denticulate, usually thin; corolla yellow or yellowish, throat purplish; anthers somewhat purplish; fruiting calyx 10-angled; berry red or purple, filling or bursting the calyx. Fields and waste places; July-September; infrequent; Page and Fremont counties; forms have been referred to this species from Winneshiek, Allamakee, Fayette, Jones, Des Moines, Lee, Story, Calhoun, and Pottawattamie counties.

* * *Perennials by short and thick or running rootstocks.*

† *Pubescence little or none; fruiting calyx scarcely sunken at the base.*

P. longifolia Nutt. Perennial, rootstock thick, stem 1-3 feet high, slightly angled, branched, glabrous; leaves lanceolate, oblanceolate, or linear, repand or nearly entire; corolla yellow, with a dark center; anthers yellow; fruiting calyx ovoid; berry yellow. Prairies and open woods; July-September; infrequent; Allamakee county. (*P. lanceolata* var. *laevigata* Gray.)

P. lanceolata Mx. Perennial, stem 4-16 inches high, more or less pubescent with simple or 2-3-forked hairs; leaves spatulate or oblanceolate, usually entire, rarely undulate or angulately toothed; anthers yellow; berry reddish. Fields and prairies; June-September; common.

† † *Pubescence sparse; fruiting calyx deeply sunken at the base.*

P. virginiana Mill. Rootstock thick, somewhat fleshy; stem 1-3 feet high, erect, branched, angular, somewhat strigose-hairy; leaves ovate-lanceolate, tapering both ways, more or less sinuately-dentate; corolla sulphur-yellow, with purplish spots; anthers yellow; fruiting calyx pyramidal-ovoid, 5-angled, base sunken; berry reddish. Rich soil; June-September; infrequent; Decatur county; reported from other localities but probably confused with the following.

† † † *Pubescence dense, more or less viscid or glandular.*

P. heterophylla Nees. Rootstock slender, creeping; stem 1-3 feet high, erect, at length decumbent and spreading, villous, viscid and glandular; leaves broadly cordate, acute, sinuately toothed or nearly entire; corolla greenish yellow, with a brownish or purplish center; anthers usually yellow; berry yellow. Rich soil; July-September; common. (*P. virginiana* Mill. of Gray's Manual but not of Miller). This is a very variable species and the following varieties have been recognized as belonging to our flora. The variety *AMBIGUA* (Gray) Rydberg, upright, long-villous, scarcely viscid; flowers larger than those of the type; anthers purplish. The variety *NYCTAGINEA* (Dunal) Rydberg, leaves dark green, firm, acuminate, nearly subentire, pubescent mainly on the veins beneath.

NICANDRA Adans. An erect glabrous annual, with alternate petioled thin sinuate-dentate or lobed leaves, and solitary axillary nodding flowers.

Calyx 5-parted, much inflated in fruit, its segments ovate, sagittate at the base. Corolla obscurely 5-lobed, light blue, campanulate. Stamens 5, included. Ovary 3-5-celled; style slender; stigma 3-5-lobed. Berry globose, nearly dry.

N. physaloides Gaertn. *Apple-of-Peru.* Stem 2-5 feet high, angled; leaves ovate or oblong. Fields and waste places; July-September; infrequent; Muscatine and Fremont counties.

LYCIUM L. Represented with us by a small shrub. Leaves small, alternate, entire. Calyx campanulate, 3-5-lobed, not enlarged in fruit, persistent. Stamens 5, slightly exserted. Ovary 2-celled; style slender. Berry oval, orange red.

L. vulgare Dunal. *Matrimony Vine.* A low shrub, with long slender recurved branches, lanceolate oblong or spatulate leaves, and greenish-purple flowers. Frequent in cultivation but rarely escaped to roadsides and waste places; May-August; Muscatine, Henry, Des Moines, Lee, Appanoose, Decatur, and Page counties.

DATURA L. Ill-scented annuals, with ovate angulately toothed leaves, and large axillary short-peduncled flowers. Calyx prismatic, deciduous in fruit by a transverse scission near the base. Corolla funneliform, the limb 5-toothed. Stamens 5, perfect, included. Style 1; stigma 2-lipped. Fruit a spiny capsule, globular, 2 celled at the top, below 4-celled by a false partition.

D. stramonium L. *Jimson-weed. Thorn-Apple.* Stem green, 1-5 feet high; corolla white. Waste grounds; June-September; frequent.

D. tatula L. Stem purple; corolla bluish-white. With the preceding; June-September; frequent.

Lycopersicum esculentum Mill. The common tomato, is rarely found as an escape in waste places. (*Lycopersicon lycopersicum* (L.) Karsten).

SCROPHULARIACEAE Lindl. FIGWORT FAMILY.

Ours herbs, with alternate or opposite exstipulate leaves, and irregular mostly 5-parted flowers. Leaves variously modified. Corolla imbricated in the bud, 2-lipped or nearly regular. Stamens 2-5, inserted on the tube of the corolla, didynamous or equal, 1-3 of them usually rudimentary. Ovary free, 2-celled; style 1, stigma 2-lobed. Fruit a 2-celled many-seeded capsule.

Sub-order **ANTIRRHINIDEAE** Bentham. Upper lip of the corolla usually covering the lower.

Tribe **Verbascaceae.** Leaves alternate; flowers spicate or racemose; corolla rotate, its lobes subequal.

VERBASCUM. Stamens 5, all antheriferous.

Tribe **Antirrhineae.** Leaves opposite; flowers racemose; corolla tubular, spurred below.

LINARIA. Corolla with a slender spur; stamens 4; capsule opening near the summit.

Tribe **Cheloneae.** Leaves opposite; flowers in cymose or umbel-like clusters, often collectively paniculate; corolla tubular or irregular, 2-lipped, not saccate or spurred; stamens 4 and a rudimentary fifth.

SCROPHULARIA. Corolla small, globose, 4 of its lobes erect, the fifth reflexed; fifth stamen a scale from the upper lip.

PENTSTEMON. Corolla tubular; fifth stamen as long as the others; seeds angular, wingless.

CHELONE. Calyx with three bracts at the base; corolla tubular, inflated, fifth stamen shorter, seeds winged.

COLLINSIA. Corolla blue and white, 2-cleft, saccate above, fifth stamen gland-like.

Tribe Gratiolae. Leaves mostly opposite; flowers solitary, axillary; stamens with anthers 2-4, fifth stamen wanting.

MIMULUS. Leaves simple; calyx 5-angled, 5-toothed, corolla elongated; stamens 4.

HERPESTIS. Leaves simple; calyx-segments unequal, the upper one the largest; stamens 4.

CONOBEA. Leaves pinnately parted; calyx 5-parted; corolla short; stamens 4.

GRATIOLA. Leaves simple; stamens with anthers 2, the sterile short or wanting.

ILYSANTHES. Leaves simple; stamens with anthers 2; the sterile exserted.

Sub-order RHINANTHIDEAE Benth. Under lip or the lateral lobes covering the upper lip in the bud.

Tribe Digitaleae. Leaves alternate, opposite, verticillate or basal; flowers racemose; calyx 4-parted; stamens 2-4; anthers 2-celled.

VERONICA. Leaves opposite or verticillate, corolla rotate or salverform, nearly regular; stamens 2.

SYNTHYRIS. Leaves alternate and basal; corolla campanulate, 2-4-lobed, irregular; stamens 2-4.

Tribe Gerardeae. Leaves opposite or the upper alternate; stamens 4, in pairs; anthers 2-celled.

GERARDIA. Stamens didynamous, included.

SEYMERIA. Stamens nearly equal, scarcely if at all exserted.

Tribe Euphrasieae. Leaves alternate or opposite; flowers racemose or spicate; corolla tubular, 2-lipped, upper lip arched or curved; stamens didynamous.

CASTILLEJA. Leaves alternate; anther-cells unequal, separate; capsule many-seeded.

PEDICULARIS. Leaves alternate or opposite; anther-cells equal, not separate; capsule many-seeded.

MELAMPYRUM. Leaves opposite; anther-cells equal; capsule 1-4-seeded.

VERBASCUM L. *Mullein.* Biennial, with alternate leaves, and ephemeral racemose or spicate flowers. Calyx 5-parted. Corolla rotate, with 5 sub-equal lobes. Stamens 5, perfect, 3 or 5 filaments bearded.

V. thapsus L. *Common M.* Woolly throughout; stem 2-5 feet high, rarely branched; leaves entire, oblong-ovate, decurrent; flowers in a dense spike, yellow; the 3 upper stamens bearded. Fields and waste places; July-August; common.

V. blattaria L. *Moth M.* Stem 2-4 feet high, simple or branched, smoothish; leaves oblong, ovate or lanceolate, clasping, coarsely dentate, lower leaves often lyrate, petioled, doubly serrate, lacinate or pinnatifid; flowers in a loose raceme, yellow or white with a purplish tinge; stamens bearded with violet hairs. Waste places; July-August; frequent; Johnson and Van Buren counties; reported from Muscatine and Story counties.

LINARIA Juss. Calyx 5-parted. Corolla spurred at the base, 2-lipped, upper lip 2-lobed, lower 3-lobed; throat almost closed by a prominent palate. Stamens 4. Style slender; stigma scarcely lobed. Capsule thin, many-seeded; opening irregularly near the summit.

L. vulgaris Mill. *Butter and Eggs.* Perennial; stem 1-3 feet high, glabrous; leaves alternate, linear, entire, sessile; flowers yellow, in a dense raceme, spur long, slender; seeds winged. Fields and roadsides; July-September; infrequent throughout the eastern half of the state; Winneshiek, Clayton, Louise, Johnson, Henry, Des Moines, Lee, Wapello, Van Buren, Appanoose, Decatur, Page, Clark, and Webster counties; reported from Fayette, Muscatine, and Story counties. (*L. linaria* (L.) Karst.)

L. canadensis (L.) Dumort. Annual or biennial; leaves linear or linear-oblong; flowers blue and white, in a long slender raceme; spur filiform, curved. Sandy soil; June-September; reported by Arthur from Linn and Benton counties.

SCROPHULARIA L. Coarse perennials, with opposite leaves, and small greenish purple cymose flowers. Calyx 5-parted. Corolla short, 5-lobed, 4 lobes erect, the fifth reflexed; tube globose. Stamens included, 4, and a rudimentary fifth on the upper side of the throat of the corolla.

S. marylandica L. *Figwort.* Stem 3-7 feet high, 4-angled, glabrous, branching; leaves large, ovate or ovate-lanceolate, thin, acuminate, sharply serrate; cymes in a slender terminal thyrselike panicle; corolla brownish, purple within; sterile stamen deep purple. Woods; June-August; common.

PENTSTEMON Solander. **BEARD-TONGUE.** Perennials, simple or branched from the base. Leaves opposite, the upper sessile, the lower petioled. Flowers thyrsoid or racemose-panicked, showy. Calyx 5-parted. Corolla tubular, often inflated or campanulate, usually 2-lipped, upper lip 2-lobed, lower 3-lobed. Stamens 5, 4 antheriferous, declined below, ascending above, the 5th sterile. Capsule ovoid-conical, with many angular seeds.

P. pubescens Solander. Stem 1-3 feet high, downy-pubescent; leaves oblong to lanceolate, denticulate or entire, radical leaves ovate or oblong; flowers in a narrow panicle; corolla pale-purple, gradually dilated, throat nearly closed by 2-bearded folds from the lower lip; sterile filament bearded. Hills and bluffs; June; frequent; Muscatine, Henry, Appanoose, and Lyon counties; reported from Scott county. (*P. hirsutus* (L.) Willd.)

P. digitalis (Sweet) Nutt. Stem 2-5 feet high, glabrous; leaves ovate-lanceolate, usually serrulate; the basal oval or oblong; corolla white, inflated, campanulate, throat open, beardless; sterile filament thinly bearded. Woods; June; frequent; Muscatine, Louisa, Lee, Johnson, Appanoose, and Lyon counties.

P. gracilis Nutt. Stem 6-18 inches high, glabrous or nearly so below; basal or lower leaves linear-oblong or spatulate, denticulate or entire, the upper linear-lanceolate or lanceolate, denticulate; inflorescence glandular-pubescent; corolla purple. Prairies; May-June; infrequent; Lyon county.

P. grandiflorus Nutt. Stem 2-3 feet high, glabrous, glaucous; cauline leaves oblong or oval, thick, entire clasping or perfoliate; the basal obovate; corolla large, campanulate, nearly regular, lavender-blue; sterile filament incurved at the apex, puberulent. Sandy soil; June-August; not common; Muscatine, Louisa, Fremont, Pottawattamie, and Lyon counties; reported from Dubuque, Delaware, Black Hawk, and Woodbury counties.

CHELONE L. **TURTLE-HEAD.** Erect perennials, with angled stems, and opposite petioled leaves. Flowers axillary, nearly sessile, in clusters; calyx with three bracts, 5-parted, segments ovate or lanceolate. Corolla tubular, inflated, 2-lipped, much longer than the calyx; upper lip arched, notched at the apex or entire, lower lip 3-lobed, bearded in the throat. Stamens 4, with woolly filaments and anthers, fifth stamen rudimentary. Seeds with a membranous wing.

C. glabra L. Stem slender, 1-5 feet high; leaves sessile or short-petioled, narrowly lanceolate, tapering both ways, appressed serrate; flowers clustered, white or roseate, bracts not ciliate. Wet places; infrequent; July-September; Winneshiek, Allamakee, Dubuque, Muscatine, and Johnson counties; reported from Fayette county.

C. obliqua L. Stem slender, 1-4 feet high; leaves broadly lanceolate or oblong, incisely serrate; flowers rose-purple, bracts ciliolate. Wet grounds, in thickets; August-September; infrequent; Muscatine, Des Moines, and Jefferson counties.

COLLINSIA Nutt. Low delicate annuals or biennials, with opposite leaves, and axillary or terminal umbellate flowers. Calyx 5-cleft. Corolla 2-lipped, upper lip 2-cleft, lower lip 3-lobed; tube saccate. Stamens 4, and a rudimentary gland-like fifth.

C. verna Nutt. Stem 6-18 inches high, branched, glabrous or puberulent; leaves clasping, ovate or ovate-lanceolate; peduncles slender; whorls of 2-6 flowers; corolla blue and white, twice the length of the narrow calyx-teeth. April-May; frequent locally; Jefferson county; reported from Lee county.

MIMULUS L. MONKEY-FLOWER. Stems square, prostrate or erect. Leaves simple, opposite. Flowers peduncled, axillary, solitary. Calyx 5-angled, 5-toothed, the upper tooth the largest. Corolla ringent, 2-lipped; upper lip 2-lobed, the lower lip 3-lobed. Stamens 4. Stigma 2-lobed. Capsule many-seeded.

* *Corolla violet, rarely white.*

M. ringens L. Perennial; stem 1-3 feet high, glabrous; leaves lanceolate, sessile, acuminate, entire or serrate, base cordate-clasping; peduncle longer than the calyx; calyx-teeth nearly equal; corolla violet, rarely white, throat closed by prominent folds. Along ditches and in wet grounds; July-August; common.

M. dictus Solander. Perennial, glabrous; stem narrowly winged at the angles; leaves ovate, ovate-lanceolate or oblong, acuminate, conspicuously serrate, marginated-petioled; peduncle shorter than the calyx; corolla violet. Wet woods; July; Appanoose and Decatur counties.

* * *Corolla yellow.*

M. jonesii T. & G. Perennial by stolons; stems spreading, diffuse, rooting, smooth; leaves roundish, obscurely serrate, sessile or petioled, palmately veined; calyx ovate, oblique, upper tooth longest, inflated in fruit; corolla yellow, lower lip bearded, throat open. Calcareous springs, wet ravines; May-June; Winnesiek and Des Moines counties.

CONOBEA Aubl. Ours an annual herb, with opposite pinnately parted leaves, and small greenish-white axillary mostly solitary flowers. Calyx 5-parted, the segments narrow, equal. Corolla irregular, tube cylindric, the limb 2-lipped; upper lip 2-lobed; lower lip 3-lobed. Stamens 4, didynamous, included. Capsule narrowly ovoid, glabrous, many-seeded.

C. multifida (Mx.) Benth. Stem 4-8 inches high, at length diffusely branched; leaves petioled, segments linear or linear-oblong, obtuse, entire or incised. Shores of streams and rivers; July-September; reported from Fayette, Muscatine, and Lee counties.

HERPESTIS Gaertn. Ours a perennial by stolons, with opposite entire leaves, and small blue peduncled axillary flowers. Calyx 5-parted. Corolla 2-lipped; upper lip 2-lobed, lower lip 3-lobed. Stamens 4, didynamous, included. Capsule oblong, obtuse, many-seeded.

H. rotundifolia (Mx.) Pursh. Stems creeping, spreading, simple or branched; villous-pubescent; leaves obovate to orbicular, palmately veined; flowers 1 or 2 in the axils. Muddy shores; June-September; reported from Scott county. (*Monnieria rotundifolia* Mx.)

GRATIOLA L. Low herbs, with opposite sessile leaves, and solitary axillary peduncled flowers. Calyx 2-bracted near the base, 5-parted, divisions slender, nearly equal. Corolla 2-lipped; upper lip entire or 2-cleft, lower 3-cleft. Stamens included, 2 antheriferous, posterior, the anterior 2 rudimentary and sterile or wanting. Capsule 2-celled, 4-valved, many-seeded.

G. virginiana L. Stem 4-7 inches high, much-branched, glandular-pubescent; leaves oblong or oblong-lanceolate, remotely toothed; peduncles slender, as long as the leaves; bracts leaf-like, equaling the calyx; flowers white or pale yellow; sterile filaments minute or wanting. Low grounds, fields and woods; June-August; frequent; Winneshiek, Fayette, Johnson, Muscatine, Henry, Appanoose, Wayne, Decatur, and Ringgold counties.

ILYSANTHES Raf. Annuals, with opposite sessile leaves, and small purplish axillary flowers on slender naked pedicels. Calyx 5-parted, divisions nearly equal. Corolla 2-lipped; upper lip erect, 2-lobed, lower spreading 3-cleft. Fertile stamens 2; sterile stamens 2, forked, one division glandular. Stigma 2-lobed. Capsule ovate or oblong, about equaling the calyx, many-seeded.

I. riparia Raf. Stem 3-7 inches high, branched, spreading or erect; leaves ovate, ovate-oblong, or the lower obovate, obscurely toothed. River banks, July-August; frequent; Fayette, Johnson, Van Buren, Decatur, Ringgold, Emmet, Chickasaw, and Sioux counties; reported from Muscatine, Story, and Woodbury counties. (*I. gratioloides* (L.) Benth.)

VERONICA L. SPEEDWELL. Annual or perennial herbs, with opposite alternate or verticillate leaves, and solitary racemose or spicate flowers. Calyx usually 4-parted. Corolla rotate or salverform, usually 4-lobed, rarely 5-lobed; lower segments usually narrow. Stamens 2, exserted. Style slender; stigma capitate. Capsule flat or compressed, obtuse or obcordate, many-seeded.

* *Perennials; leaves verticillate; flowers in terminal spikes.*

V. virginica L. Culver's-root. Stem 2-6 feet high, smooth or somewhat downy; leaves 3-6 in a whorl, lanceolate, short-petioled, pointed, serrate; flowers in terminal panicled spikes; parts sometimes in 5's; corolla small, white or bluish; stamens and style much exserted; capsule oblong, obtuse. Woods and prairies; July-August; common. (*Leptandra virginica* (L.) Nutt.)

** *Perennials; flowers in axillary racemes.*

V. anagallis L. Water Speedwell. Stems fleshy, 1 foot high, smooth, decumbent and rooting, then erect; leaves opposite, sessile, clasping entire; racemes from opposite axils; flowers small, corolla bluish; capsule orbicular, slightly notched. Springs and brooks; June-July; frequent; Emmet, Winneshiek, Allamakee, Louisa, Johnson, Lyon, Winnebago, and Appanoose counties; reported from Fayette and Story counties. (*V. anagallis-aquatica* L.)

V. americana Schwein. Similar to the preceding, stoloniferous, glabrous; stem branched, decumbent; leaves ovate, oblong, or oblong-lanceolate, petioled, serrate, bases truncate, rounded, or subcordate, apex acutish or obtuse. Swamps and streams; April-September; reported from Lee county.

*** *Annuals; flowers solitary in the axils of the leaves.*

V. peregrina L. Stem 4-10 inches high, smoothish, ascending, branched; lower leaves petioled, oval-oblong, toothed, upper sessile, oblong-linear, entire; flowers short-pedicelled, solitary; corolla white, shorter than the calyx; capsule obcordate. Moist soil; May-September; common; Winneshiek, Johnson, Henry, Lee, Decatur, Dallas, and Shelby counties; reported from Fayette, Scott, Muscatine, and Story counties.

V. arvensis L. Corn Speedwell. Stem hairy, 3-9 inches high, simple or diffusely branched; lower leaves petioled, ovate, crenate, the upper sessile, ovate or lanceolate, entire; flowers very small, axillary; capsule obovate, obcordate. Grassy places in a cultivated soil and open woods; May-September;

frequent; Muscatine, Johnson, and Henry counties; reported from Winneshiek, Scott, Lee, and Story counties.

* * * * *Perennial; flowers in spicate racemes.*

V. serpyllifolia L. Glabrous or puberulent; stems slender, decumbent, the branches 2-10 inches high, erect; leaves opposite, petioled, or the uppermost sessile, ovate, oval, or oblong, entire or crenulate; flowers in short spicate racemes, corolla pale blue or whitish; capsule broader than long, notched at the summit. Fields; April-August; reported from Johnson county.

SYNTHYRIS Benth. Ours a pubescent perennial herb, with ovate or orbicular petioled basal leaves, sessile bract-like alternate caudine leaves, and greenish yellow flowers in a terminal bracteate spike. Calyx 4-5-parted, bracts oblong or linear. Corolla usually 2-lobed, sometimes 3-4-lobed. Stamens usually 2, sometimes 4. Ovary 2-3-celled; style slender; stigma capitate. Capsule compressed, emarginate, many-seeded.

S. houghtoniana Benth. Stem 1-2 feet high, basal leaves truncate or cordate at the base, crenulate, 5-7-nerved, caudine leaves small, somewhat clasping, crenulate. Sandy open woods; May-July; infrequent or rare; Muscatine county; reported from Fayette and Scott counties. (*Wulfenia houghtoniana* (Benth.) Greene.)

GERARDIA L. Annual or perennial erect and branched herbs, with opposite or alternate leaves, and showy racemose paniculate or solitary and axillary rose-purple varying to white or yellow flowers. Calyx campanulate, 5-toothed or 5-lobed. Corolla tubular, varying to campanulate or funnel-form, limb 5-lobed, the 2 upper lobes usually smaller and somewhat united. Stamens 4, didynamous, included. Style slender, thickened at the apex. Capsule globose or ovoid, pointed, many-seeded.

* *Corolla yellow, the tube woolly; anthers awned at the base; leaves rather large, more or less incised or pinnatifid; perennials.*

G. grandiflora Benth. Stem minutely downy, 2-4 feet high, branched; leaves ovate-lanceolate, incisely cut or pinnatifid; pedicels about the length of the calyx; corolla about 2-inches long, yellow. Open woods; July-August; frequent; Muscatine, Henry, Van Buren, Jefferson, and Appanoose counties. (*Dasytoma grandiflora* (Benth.) Wood.)

G. flava L. Downy grayish; stem 2-4 feet high, usually simple; leaves lanceolate, ovate-lanceolate, or oblong, entire or the lower sinuate-toothed or pinnatifid, short-petioled or the upper sessile. Woods and thickets; July-August; forms from Clinton, Jones, Johnson, and Henry counties have been referred to this species. (*Dasytoma flava* (L.) Wood.)

* * *Anthers awnless; flowers pedicelled, purple or pink; annuals.*

+ *Pedicels shorter or scarcely longer than the calyx and capsule.*

G. aspera Dougl. Stem somewhat branched, 1-2 feet high, hispidulous-scabrous; leaves narrowly linear, rough-hispid; pedicels equaling or about twice the length of the calyx; calyx-lobes triangular-lanceolate, shorter than the tube; corolla 1 inch long, purple. Prairies; August-September; infrequent; Delaware, Henry, Decatur, and Lyon counties; reported from Fayette, Scott, Story, and Emmet counties.

G. purpurea L. Stem 1-2 feet high, glabrous, branched; leaves narrowly linear, rough-margined; flowers racemose, purple, pedicels usually shorter than the calyx. Fields and meadows; August-September; infrequent; Emmet county; reported from Fayette and Hamilton counties.

† *Pedicels slender, usually exceeding the corolla; anther-sacs mucronate at the base.*

G. tenuifolia Vahl. Stem about 10 inches high, glabrous, paniculately branched; leaves narrowly linear; pedicels exceeding the corolla, often longer than the leaves, slender; calyx small, with 5 short acute teeth; corolla light purple, about one-half inch in length; capsule globose, scarcely exceeding the calyx. Low grounds in fields and woods; August-September; common; Winneshiek, Delaware, Johnson, Washington, Jefferson, Henry, Des Moines, Emmet, and Lyon counties; reported from Fayette, Scott, Muscatine, Story, and Harrison counties.

G. besseyana Britton. Similar to the preceding, stouter; leaves larger, seaceous; corolla purple; calyx-teeth triangular-subulate, about one-third the length of the tube; capsule globose, exceeding the calyx. Dry soil; July-September; reported from Fremont and Pottawattamie counties. (*G. tenuifolia* var. *macrophylla* Benth. of Gray's Manual.)

* * * *Flowers sessile; anthers pointed, those of the shorter stamens smaller.*

G. curiculata Mx. Annual, rough-hairy; stem 1-3 feet high, simple or branched above; leaves lanceolate or ovate-lanceolate, acuminate, sessile, entire, many with an oblong or lanceolate lobe on one side at the base; flowers solitary, sessile, purple. Low prairies; July-September; frequent; Johnson, Henry, and Decatur counties; reported from Fayette, Scott, Story, and Emmet counties.

SEYMERIA Pursh. Erect branching perennials, with opposite dissected or entire leaves, and yellow flowers. Calyx campanulate, 5-cleft. Corolla-tube short and broad; limb of 5 ovate or oblong nearly equal spreading lobes. Stamens 4, nearly equal.

S. macrophylla Nutt. *Mullein Foxglove.* Stem 3-6 feet high, pubescent to glabrate; lower leaves pinnatifid, divisions lance-oblong, incised, upper lanceolate, serrate or entire; flowers short-pedicelled, axillary, in a long interrupted spike; corolla woolly inside; filaments woolly; style short; capsule globose or ovoid, flat mucronate pointed, many-seeded. Woods near water courses; July-August; frequent; Muscatine, Johnson, Des Moines, Van Buren, Decatur, and Page counties. (*Afzelia macrophylla* (Nutt.) Kuntze.)

CASTILLEJA Mutis. Roots parasitic. Leaves alternate, sessile, entire or cut-lobed; the floral often colored. Flowers in leafy bracted spikes. Calyx 2-4-cleft. Corolla 2-lipped; upper lip long, linear, arched and keeled; lower lip short, 3-lobed; corolla-tube short, included by the calyx. Stamens 4, didynamous, enfolded by the upper lip. Anthers 2-celled; cells oblong-linear, unequal, outer cell suspended, inner pendulous.

C. coccinea (L.) Spreng. Annual or biennial, hairy, stem 8-16 inches high; radical leaves clustered, obovate or oblong, entire; caudine leaves incisely cut into segments; floral bracts 3-5-cleft, scarlet; calyx 2-cleft; corolla scarcely longer, pale yellow. Sandy soil in open woods; May-July; frequent; Winneshiek, Delaware, Johnson, Appanoose, and Cerro Gordo counties; reported from Fayette, Scott, and Muscatine counties.

C. sessiliflora Pursh. Perennial; stem 6-14 inches high, grayish pubescent; leaves oblong-linear, entire or 5-cleft, divisions narrow, diverging; floral leaves similar; calyx deeply cleft; corolla long. Prairies; frequent westward; May-July; Emmet, Delaware, Story, Hardin, Hamilton, Shelby, and Lyon counties; reported from Fayette and Woodbury counties.

PEDICULARIS L. *Lousewort.* Perennials. Leaves pinnatifid, floral bract-like. Flowers yellow, spicate. Calyx inflated, 2-5-cleft. Corolla

2-lipped; upper lip vaulted, covering the 4-stamens; lower lip spreading, 3-lobed. Anther-cells equal.

P. canadensis L. *Common L.* Hairy, stems usually tufted, 6-12 inches high; leaves alternate, petioled, pinnatifid, segments toothed; flowers in a dense spike; calyx incised in front, oblique; upper lip of corolla hooded, incurved, with 2 teeth. Capsule flattish, sword-beaked. Fields and woods; May-July; common; Winneshiek, Allamakee, Clayton, Johnson, Decatur, Story, Pottawattamie, Shelby, Calhoun, Hancock, Cerro Gordo, Dallas, Emmet, and Lyon counties; reported from Fayette, Scott, and Muscatine counties.

P. lanceolata Mx. Stem 1-2 feet high, somewhat hairy or glabrous; leaves mostly opposite, lance-oblance, doubly crenate-toothed; spike dense; calyx 2-lobed; upper lip of the corolla larger, covering the lower; capsule ovate, about the length of the calyx. Swampy places; August-September; frequent; Winneshiek, Johnson, Winnebago, Hancock, Emmet, and Lyon counties; reported from Fayette, Scott, and Story counties.

MELAMPYRUM L. Ours a small branching annual herb, with opposite entire petioled lanceolate or linear-lanceolate leaves, and small white or whitish flowers solitary in the upper axils or more or less spicate. Calyx 4-toothed. Corolla irregular, 2-lipped; upper lip obtuse or emarginate, lower lip 3-toothed. Stamens 4, didynamous. Capsule flat, oblique, 2-4-seeded.

M. americanum Mx. *Cow-Wheat.* Puberulent; stem 6-18 inches high, obscurely 4-sided; leaves short-petioled, the floral ovate or lanceolate, with a few bristle-pointed teeth near the base; calyx-teeth subulate; corolla thrice the length of the calyx, lower lip yellow. Dry woods; May-August; reported from Lee county.

OROBANCHACEAE *Linell.* BROOM-RAPE FAMILY.

Herbs, destitute of green foliage, with parasitic roots, alternate scales in place of leaves, and solitary or spicate flowers. Calyx 4-5-cleft or 4-5-toothed, persistent, free from the ovary. Corolla irregular, tubular, 2-lipped, withering-persistent. Stamens 4, didynamous, inserted on the tube of the corolla; anthers 2-celled. Ovary ovoid, 1-celled, with 2-4 parietal placentae. Capsule 2-valved, many-seeded.

APHYLLON Mitchell. Brownish or whitish plants with perfect flowers. Calyx of 5 regular teeth. Upper lip of the corolla 2-lobed; lower 3-lobed. Capsule with 2 or 4 placentae.

A. uniflorum Gray. *Naked Broom-rape.* Stem short, scaly, mostly subterranean; flowers solitary, on bractless scapes which are 3-6 inches high, purplish or yellowish; calyx-lobes subulate; corolla-lobes large, obovate. Prairies or woods; May-June; infrequent; Johnson, Jefferson, and Decatur counties; reported from Story and Lee counties. (*Thalesia uniflora* (L.) Britton.)

A. ludovicianum Gray. Stems 3-10 inches high, solitary or clustered; glandular-pubescent, branched; flowers in a dense terminal spike; calyx usually with 2 bracts at the base; calyx-lobes narrowly lanceolate; corolla longer, slightly curved, upper lip but little if any 2-cleft; placentae apparently 2. Dry soil; June-August; infrequent; Lyon county. (*Orobanche ludoviciana* Nutt.)

LENTIBULARIACEAE *Lindl.* BLADDERWORT FAMILY.

Terrestrial or aquatic herbs with showy solitary or racemose scapose flowers. Calyx 2-lipped, inferior. Corolla 2-lipped, irregular; upper lip entire or 2-lobed; lower lip 3-lobed, with a prominent usually bearded palate, spurred below. Stamens 2, included, inserted on the upper lip; anthers 1-celled. Ovary 1-celled, with a free central placenta, becoming a globular many-seeded capsule.

UTRICULARIA L. Aquatic or rooting in the mud, stems and dissected foliage bladder bearing. Scapes 1-few-flowered. Lips of the calyx nearly equal, nearly entire. Upper lip of the corolla erect. Filaments incurved. Stigma 2-lamellate. The species of this genus are often propagated by winter buds.

U. vulgaris L. *Greater Bladderwort.* Perennial; immersed stems 1-3 feet long; leaves many, with many bladders, 2-3-pinnately divided; scapes naked or with a few scales, 3-20-flowered, 5-12 inches high; corolla yellow, closed; spur conical, shorter than the lower lip; pedicels recurved in fruit. River sloughs and ponds; June-August; infrequent; Muscatine, Louisa, Linn, Decatur, Fremont, Story, Winnebago, and Emmet counties; reported from Fayette and Sioux counties.

U. biflora Lam. Scape 2-5 inches high, 1-3-flowered; leaves at the base of the scape root-like, capillary, bearing numerous bladders; corolla yellow, spur oblong, obtuse, equaling the lower lip; pedicels erect. Ponds; reported from Muscatine county. Associated with *Brasenia peltata* Pursh.

U. intermedia Hayne. Scape capillary, 1-4-flowered; leaves 2-ranked, crowded, 4-5 times forked, divisions linear-subulate, rigid; bladders infrequent, on leafless branches; corolla yellow, spur conical, acute. Shallow water; June-August; reported from Emmet county.

BIGNONIACEAE *Pers.* TRUMPET CREEPER FAMILY.

Trees or shrubs, with opposite simple or pinnate exstipulate leaves, and large showy flowers. Calyx entire, 2-lipped or 5-cleft. Corolla tubular or campanulate, 5-lobed, irregular or 2-lipped, deciduous. Stamens 5, inserted on the corolla, 1-3 sterile or rudimentary. Anthers 2-celled. Ovary free; style long; stigma 2-lobed. Capsule woody, 2-valved, with many winged flat seeds.

TECOMA. Leaves pinnate.

CATALPA. Leaves simple.

TECOMA Juss. Calyx campanulate, 5-toothed. Corolla funneliform, limb with 5 nearly equal lobes. Fertile stamens 4, didynamous, the 5th rudimentary. Capsule flattish at right angles to the partition, 2-valved.

T. radicans (L.) DC. *Trumpet Creeper.* With us a glabrous woody vine; leaflets 7-11, ovate, acuminate, coarsely serrate; corolla large, orange and scarlet; stamens included. Waste places; July-September; becoming a frequent escape; Muscatine, Louisa, and Lee counties.

CATALPA Scop. Calyx 2-parted. Corolla campanulate, 5-lobed, 2-lipped. Fertile stamens 2, occasionally 4, rudimentary or sterile stamens 3 or 1. Capsule terete, long, 2-celled, opening at right angles to the valve.

C. speciosa Warder. *Catalpa Tree. Larger Indian Bean.* Leaves large, long-petioled, cordate, acuminate, sometimes angulately lobed, pubescent beneath; corolla large, white, slightly spotted, tube obconical, limb slightly oblique.

lower lobe emarginate; capsule 1 foot long, nearly one inch in diameter. Rich soil; June-July; frequent in cultivation, rarely an escape.

C. bignonioides Walt. *Catalpa. Indian Bean.* Similar to the preceding species; leaves strong-scented; lower lobe of the corolla emarginate; capsule smaller, thinner. Infrequent in cultivation, probably not an escape. (*C. catalpa* (L.) Karst.)

MARTYNIACEAE Link. UNICORN-PLANT FAMILY.

Ours a densely glandular-pubescent annual herb, with opposite broadly ovate or orbicular leaves, and perfect irregular whitish or yellowish racemose flowers. Calyx 4-5-cleft or 4-5-parted or cleft on the lower side. Corolla-tube oblique; the limb slightly 2-lipped, of 5 nearly equal lobes. Stamens with anthers 4, didynamous. Ovary 1-celled, with 2 parietal placentae, or 4-celled by the extension of the placentae in fruit. Represented with us by the genus **MARTYNIA** L.

M. proboscidea Gloc. *Unicorn-Plant.* Stem much branched, stout, the branches prostrate or ascending, 1-3 feet long; leaves entire, undulate or repand, apex rounded, base cordate; calyx with 1-2 oblong or linear deciduous bractlets at the base; corolla mottled with purple; fruit 4-6 inches long, body straightish; beaks 2, long and strongly recurved. Alluvial soil and in waste places; July-September; infrequent; Jefferson, Linn, Taylor, and Emmet counties; reported from Harrison county. The species is a native of the Mississippi valley. Of late years it seems to assume the nature of a weed and appears by the waysides and in cultivated fields.

ACANTHACEAE J. St. Hil. ACANTHUS FAMILY.

Mostly herbs, with opposite simple entire exstipulate leaves, and perfect bracted flowers. Calyx 4-5-parted. Corolla tubular, limb 5-lobed, or 2-lipped, convolute in the bud. Stamens 4, didynamous, or only 2, inserted on the corolla. Style slender; stigma 2-cleft. Ovary 2-celled. Fruit a capsule, 2-celled, 4-12-seeded.

RUELLIA. Corolla convolute in the bud, nearly regular; stamens 4.

DIANTHERA. Corolla imbricated in the bud, strongly 2-lipped; stamens 2.

RUELLIA L. Perennials with tumid joints, and showy axillary flowers. Calyx 5-cleft or 5-parted; segments slender. Corolla funnelform, limb spreading, nearly equally lobed. Stamens 4, included, didynamous; anthers 2-celled. Capsule narrow, somewhat flattened.

R. ciliosa Pursh. Stem 8-30 inches high, clothed with whitish hairs; leaves sessile or nearly so, oval or ovate-oblong; flowers clustered or solitary, 2-bracted, nearly sessile, blue; calyx-segments filiform; corolla-tube $1\frac{1}{2}$ -2 inches in length or about twice the length of the calyx-segments, throat short, limb ample. Fields and borders of woods; June-September; common.

R. strepens L. Stem 1-4 feet high, glabrous or slightly pubescent; leaves ovate to oblong, petioled; calyx-lobes linear or lanceolate. Wooded ravines; June-July; infrequent; Decatur, Appanoose, and Henry counties.

DIANTHERA L. Ours a perennial glabrous herb, with short-petioled or sessile lanceolate or linear-lanceolate leaves, and pedunculate capitate-spicate violet or whitish flowers. Calyx 4-5-parted, the segments narrow. Corolla-tube slender, short; limb 2-lipped, upper lip entire or 2-dentate, lower lip 3-cleft, spreading. Stamens 2, inserted on the throat of the corolla. Cells of the

ovary each with 2 ovules. Capsule contracted below into a long stipe, 4-seeded.

D. americana L. Stem mostly simple, 1-3 feet high, peduncles axillary, slender; bractlets linear-subulate. Wet places; May-August; Henry county.

VERBENACEAE J. St. Hil. VERVAIN FAMILY.

Herbs, with opposite exstipulate leaves, and perfect more or less irregular flowers. Calyx 4-5-lobed or 4-5-cleft. Corolla 2-lipped or regular. Stamens 4, didynamous or only 2. Fruit dry or drupaceous, usually splitting into as many 1-seeded nutlets as the ovary has cells.

* *Ovary 2-4-celled.*

VERBENA. Flowers spicate or in heads; nutlets 4, 1-seeded.

LIPPIA. Flowers spicate or in heads; nutlets 2.

** *Ovary 1-celled.*

PHRYMA. Flowers in slender spikes; fruit an achene.

VERBENA L. **VERVAIN.** Annuals or perennials, with sessile bracted flowers arranged in solitary or panicled spikes. Calyx tubular, 5-toothed, one of the teeth frequently shorter. Corolla tubular, limb somewhat unequally 5-cleft. Stamens 4, included, upper pair sometimes abortive. Style slender; stigma usually 2-lobed.

* *Perennial; spikes rather thick and densely flowered; bracts small.*

V. hastata L. *Blue V.* Stem 3-6 feet high, pubescent; leaves lanceolate to oblong-lanceolate, gradually acuminate, coarsely serrate, petioled, the lower often lobed or hastate; spikes linear, many-flowered, erect, corymbed or panicled; flowers blue, sometimes roseate. Waysides and waste places; July-September; common.

V. stricta Vent. *Hoary V.* Whole plant whitish-hirsute; stem 1-2 feet high, simple or branched; leaves sessile, oval, obovate, or oblong, unequally serrate; spikes dense; flowers blue, varying to whitish. Dry soil; July-September; common.

V. angustifolia Mx. Stem 1-2 feet high, simple or branched, sparingly hirsute; leaves linear or narrowly lanceolate, serrate, tapering to the base, sessile; spikes few or solitary, slender; flowers purple or blue. Sandy soil; June-July; frequent; Allamakee, Scott, Muscatine, Johnson, Henry, Cerro Gordo, and Lyon counties.

** *Perennial; spikes filiform; bracts small.*

V. urticæfolia L. *White V.* Stem 3-5 feet high, hirsute to glabrate; leaves ovate to oblong-lanceolate, thin, petioled, serrate; spikes terminal and axillary, slender, loosely flowered; flowers small, white. Waste grounds, fields and woods; July-August; common.

*** *Annual; spikes thick, leafy-bracted.*

V. bracteosa Mx. Stem much branched from the base, diffuse or decumbent, hirsute; leaves ovate, oval, or obovate, base cuneate, usually tapering to a short margined petiole, lacinately cut or 3-cleft; flowers small, blue or purple, in short thick spikes. Pastures and waysides; June-September; frequent.

**** *Perennial; flowers showy, spicate.*

V. canadensis (L.) Britton. Low, branching, ascending, hirsute to nearly glabrous; stem 8-15 inches high; leaves ovate or ovate-oblong, incisely toothed, lobed, or 3-cleft; flowers showy, in pedunculate spikes, purplish or blue. Cultivated, reported from Story county as an escape. (*V. aubletia* L. of Gray's Manual.)

LIPPIA L. Ours a perennial herb, with opposite leaves, and small bracted flowers. Calyx 2-parted. Corolla funnelform, 2-lipped; upper lip notched; lower larger, 3-lobed. Stamens didynamous, included. Fruit a dry drupe, 2-celled, 2-seeded.

L. lanceolata Mx. *Fog-fruit*. Stem 4-angled, suberect, from an extensively creeping base; leaves obovate to ovate, base cuneate, mostly tapering into a petiole, serrate, pinnately veined, veins passing to the sinuses; flowers pale blue, in closely bracted heads which are on long axillary peduncles. River banks; July-September; frequent in the eastern counties but extending westward across the state; Clayton, Dubuque, Clinton, Scott, Muscatine, Louisa, Lee, Henry, Johnson, Van Buren, Wapello, Linn, Story, Chickasaw, and Fremont counties.

PHRYMA L. Perennial, with coarsely toothed ovate petioled leaves, and small purplish or roseate opposite flowers arranged in slender terminal spikes. Calyx 2-lipped; upper lip 3-toothed; the lower 2-toothed. Corolla 2-lipped; upper lip emarginate; the lower 3-lobed. Stamens included. Fruit dry, oblong, 1-celled, 1-seeded.

P. leptostachya L. *Lopseed*. Stem 2-3 feet high, somewhat pubescent, with slender branches; leaves thin, acute or acuminate, lower long-petioled, upper nearly sessile; flowers on very short 2-bracteolate pedicels, erect at first, deflexed in fruit. Rich open woods, thickets; June-August; common.

LABIATAE B. Juss. MINT FAMILY.

A large and natural order consisting of annual or perennial herbs, with square stems, opposite aromatic exstipulate leaves, and axillary cymose flower clusters which are frequently collected into terminal racemes, spikes, or heads. Calyx usually nerved, persistent, regular or 2-lipped, 5-lobed or 5-toothed, rarely 4-toothed. Corolla usually 2-lipped; upper lip 2-lobed or rarely entire, external in the bud; lower 3-lobed. Stamens 4, didynamous, or only 2, inserted on the tube of the corolla. Ovary superior, deeply 4-lobed, forming in fruit 4 seed-like 1-seeded nutlets or achenes. Style solitary, central, 2-lobed above.

A. Ovary 4-lobed, the style not basal; nutlets rugose reticulated, attached laterally.

Tribe Ajugoideæ. Calyx 5-10-nerved; stamens 4, parallel, ascending, mostly exserted from the upper side of the corolla; nutlets obovoid, dry.

ISANTHUS. Corolla of 5 nearly equal lobes; stamens scarcely if at all exserted.

TRICHOSTEMA. Corolla-lobes nearly equal, declined; stamens exserted.

TRICRUM. Corolla irregular, deeply cleft between the two lobes of the upper lip; stamens exserted.

B. Ovary 4-parted, the style basal; nutlets smooth or granulate, attached by their bases.

Tribe Satureineæ. Corolla 2-lipped; upper lip galeate or concave; stamens 4 or 2, not declined, the upper pair shorter or wanting; anthers 2-celled.

* *Corolla nearly equally 4-lobed; stamens erect, distant.*

MENTHA. Stamens 4; aromatic fragrant herbs.

LYCOPUS. Fertile stamens 2, the upper pair of sterile filaments or wanting.

* * *Corolla more or less 2-lipped; upper lip erect, entire or notched.*

PYCNANTHEMUM. Flowers in dense capitate heads; stamens 4, lower pair a little shorter.

HEDEOMA. Flowers in axillary clusters: fertile stamens 2; the upper pair rudimentary or wanting.

Tribe Monardeae. Corolla strongly 2-lipped; fertile stamens 2, straight or ascending; anther-cells linear-oblong, solitary or separated by a long connective.

SALVIA. Calyx 2-lipped; stamens inserted on the throat of the corolla; connective linear or filiform, transverse.

MONARDA. Calyx nearly equally 5-toothed, 15-nerved; anther cells confluent into one.

BLEPHYLIA. Calyx 2-lipped, 18-nerved; anther-cells confluent.

Tribe Nepeteae. Calyx about 15-nerved; stamens 4, all fertile; the upper pair the longer; corolla 2-lipped.

LOPHANTHUS. Stamens exserted; anther-cells parallel.

NEPETA. Stamens not exserted; anther-cells divergent.

DRACOCEPHALUM. Stamens exserted; anther-cells divergent.

Tribe Scutellarineae. Calyx 2-lipped, closed in fruit, lips entire; corolla 2-lipped; stamens 4, all fertile, ascending, parallel; upper pair shorter.

SCUTELLARIA. Upper lip of the calyx with a helmet-like appendage.

Tribe Stachydeae. Calyx 5-10-nerved, 2-lipped only in *Prunella*; stamens 4, fertile, parallel, ascending under the upper lip of the corolla; upper pair shorter.

* *Calyx 2-lipped, not membranous, closed in fruit.*

PRUNELLA. Calyx deeply 2-lipped, reticulate veiny.

* * *Calyx 5-toothed, membranous, open in fruit.*

PHYSOSTEGIA. Calyx 5-toothed, inflated in fruit.

* * * *Calyx 5-10-toothed, not membranous, 5-10-nerved.*

† *Naturalized Old World species, growing in waste places.*

MARRUBIUM. Stamens and style included in the tube of the corolla.

LEONURUS. Leaves cleft or incised; calyx-teeth spiny-pointed and spreading when old.

LAMIUM. Leaves mostly cordate; calyx-teeth lanceolate, subulate-pointed.

GALEOPSIS. Stem swollen below the joints; calyx-teeth spinescent; anthers transversely 2-valved.

† † *Native species, growing in damp soil.*

STACHYS. Stamens or only the lower pair often deflexed to the side of the throat of the corolla; nutlets obtuse.

ISANTHUS Mx. Annual, branched, with 3-nerved leaves, and 1-3-flowered axillary peduncles. Calyx campanulate, equally 5-toothed. Corolla equally 5-parted, segments ovate. Stamens 4, but slightly didynamous, incurved, ascending. Ovary deeply 4-lobed.

I. caeruleus Mx. *False Pennyroyal.* Stem 8-18 inches high, pubescent; leaves lance-oblong, nearly entire; flowers small, pale blue; corolla but little longer than the calyx. Dry soil; July-August; frequent; Winneshiek, Scott, Muscatine, Henry, Johnson, and Lyon counties; reported from Fayette county. (*I. brachiatum* (L.) B. S. P.)

TRICHOSTEMA DICHOTOMUM L. Annual, stem 6-20 inches high, viscid-pubescent; leaves oblong or oblong-lanceolate, thin; flowers paniculate; calyx oblique, unequally 5-lobed; corolla blue, pink or white, nearly regular; stamens long-exserted. Reported by Arthur, but the species seems not to have been found by any other collector. As Iowa is out of the range of the species its occurrence may be considered doubtful.

TEUCRIUM L. Perennials. Calyx nearly regular, 5-toothed. Corolla 5-lobed; lower lobe the largest, the upper four nearly equal. Stamens 4, exserted from the deep cleft between the 2 upper petals.

T. canadense L. Stem 1-3 feet high, simple, hoary-pubescent; leaves lanceolate, oblong-lanceolate, or ovate-lanceolate, acute, serrate, short-petioled, green above, whitish beneath; bracts linear-lanceolate, about the length of the calyx; flower-whorls crowded into a long spike; calyx canescent, the upper

teeth obtuse; corolla purplish, varying to cream-color. Rich soil; July-September; common.

T. occidentale A. Gray. Similar to the preceding, villous or pubescent; leaves thin, slender petioled; calyx villous, the 3 upper calyx-teeth acute or acutish. Moist soil; July-September. This species occurs near our western and southwestern border and probably belongs to our flora.

MENTHA L. Strong-scented perennial herbs, usually spreading by creeping rootstocks. Flowers small, white or purplish, glomerate. Calyx campanulate, equally 5-toothed. Corolla-tube scarcely exceeding the calyx, limb nearly equally 4-cleft. Stamens 4, erect, distant.

M. canadensis L. *Wild Mint*. Stem 1-2 feet high, simple or branched, hoary-pubescent; leaves ovate-oblong to lanceolate, tapering both ways, petioled, serrate; flower clusters shorter than the petioles; calyx hairy; stamens exserted. Wet soil; July-September; common. This species varies to almost glabrous, with short-petioled leaves, the variety *GLABRATA* Benth.

M. viridis L. *Spearmint*. A glabrous perennial, 1-2 feet high, with lanceolate sessile or short-petioled serrate leaves, and whorls of small flowers collected into a terminal narrow interrupted spike. Waste places; July-September; infrequent; Muscatine and Taylor counties; reported from Lee county.

(*M. spicata* L.)

M. piperita L. *Peppermint*. Perennial, glabrous, 1-3 feet high, with lanceolate petioled serrate leaves, and whorls of flowers in terminal dense or interrupted spikes. Waste places; July-September; reported from Lee county.

LYCOPUS L. Perennials, with sharply toothed or pinnatifid leaves, and small mostly white flowers in dense axillary whorls. Calyx campanulate, 4-5-toothed. Corolla campanulate, but little exceeding the calyx, about equally 4-lobed. Stamens 2, distant.

* Calyx-teeth mostly 4, ovate, shorter than the nutlets.

L. virginicus L. *Bugle-weed*. Stoloniferous; stem 1-2 feet high, obtusely 4-angled; leaves ovate or oblong-lanceolate, acuminate both ways, short-petioled, thin, toothed above the base. Moist shady places; July-August; frequent; Johnson, Decatur, and Emmet counties; reported from Fayette, Story, and Woodbury counties.

* * Calyx-teeth usually 5, lanceolate or subulate, longer than the nutlets.

† Bracts very small; corolla twice the length of the calyx.

L. rubellus Moench. Stoloniferous; stem 1-3 feet high, obtusely 4-angled, somewhat pubescent; leaves ovate-oblong or oblong-lanceolate, sharply serrate in the middle, acuminate both ways, petioled; calyx-teeth 5, acute. Wet soil; July-August; infrequent; Muscatine and Decatur counties; reported from Story county.

†† Bracts lanceolate or subulate; corolla less than twice the length of the calyx.

L. sinuatus Ell. Not stoloniferous, perennial by suckers; stem 1-3 feet high, acutely 4-angled, glabrous or minutely pubescent; leaves oblong or lanceolate, acuminate, sinuate, incised or pinnatifid, tapering to a slender petiole, calyx-teeth triangular-subulate and short-cuspidate. Low places; July-September; common. (*L. americanus* Muhl.)

L. lucidus Turcz. Stoloniferous, usually simple, leafy, 1-3 feet high; leaves oblong-lanceolate, sessile or short-petioled, sharply serrate; bracts ovate or lanceolate, acuminate-subulate; calyx-teeth subulate-lanceolate. Wet soil; July-September; forms from Woodbury county have been referred to this species. (*L. lucidus* var. *americanus* A. Gray.)

PYCNANTHEMUM Mx. Perennials, corymbosely branched above, with the flowers in dense capitate heads or cymes. Calyx tubular, striate, equally 5-toothed, or the 3 upper teeth partially united. Corolla 2-lipped; upper lip entire or notched; the lower 3-lobed; lobes all ovate and obtuse. Stamens 4, distant.

P. lanceolatum Pursh. Stem 1-3 feet high, glabrous or somewhat pubescent; leaves lanceolate or linear-lanceolate, sessile or nearly so, entire, nerve-veined, bracts lanceolate or ovate; calyx-teeth ovate-deltoid, acute. Dry soil; July-September; common; Winneshiek, Floyd, Jackson, Hancock, Johnson, Henry, Wapello, Appanoose, Decatur, Ringgold, Winnebago, Cerro Gordo, Dickinson, and Emmet counties; reported from Fayette and Story counties. (*Koellia virginiana* (L.) MacM.)

P. linifolium Pursh. Stem 1-2 feet high, glabrous; leaves linear-lanceolate, somewhat 3-nerved, entire, sessile or the lower short-petioled; heads downy; bracts and calyx-teeth pungently awn-pointed. Dry soil; July-September; frequent; Jackson, Delaware, Muscatine, Louisa, Johnson, Appanoose, Decatur, Ringgold, and Fremont counties; reported from Scott county. (*Koellia flexuosa* (Walt.) MacM.)

P. pilosum Nutt. Stem 1-3 feet high, hirsute or pilose; leaves lanceolate, sessile or short-petioled, mostly entire; glomerules dense, terminal, hirsute-canescens or villous; bracts lanceolate; calyx-teeth lanceolate-subulate. Dry sandy soil; July-September; reported from Muscatine, Lee, Linn, and Des Moines counties.

HEDEOMA Pers. Small odorous annuals, with small opposite leaves, and small blue or purple flowers in axillary clusters, collectively in leafy racemes. Calyx 13-nerved, gibbous at the base, bearded in the throat, 2-lipped; upper lip 3-toothed; lower 2-cleft. Corolla 2-lipped; upper lip erect, notched; lower spreading, 3-cleft. Stamens 2, fertile, sometimes 2 sterile stamens on the upper side.

H. pulegioides (L.) Pers. *American Pennyroyal*. Stem 6-12 inches high, erect, branching, pubescent; leaves petioled, oblong-obovate, somewhat serrate or entire; whorls about 6-flowered; calyx-teeth of the upper lip triangular; corolla bluish; sterile filaments present. Open upland woods; June-August; frequent; Muscatine, Louisa, Des Moines, Lee, Van Buren, Henry, Johnson, Cerro Gordo, Decatur, Page, Calhoun, Fremont, and Lyon counties; reported from Fayette and Story counties.

H. hispida Pursh. Stem 2-5 inches high, branching, pubescent; leaves sessile, linear, obtuse, entire; whorls about 6-flowered; calyx-teeth subulate; corolla bluish; sterile filaments minute or wanting. Dry soil; June-July; common; Winneshiek, Fayette, Jones, Muscatine, Linn, Johnson, Decatur, and Lyon counties; reported from Story and Woodbury counties.

SALVIA L. *SAGE*. Calyx striate, 2-lipped; the upper lip 3-toothed or entire; lower 2-cleft; throat naked. Corolla 2-lipped, ringent; upper lip straight or scythe-shaped, entire or slightly notched; lower pendant or spreading, 3-lobed. Stamens 2; anther-cells widely separated, connective transverse.

S. lanceolata Willd. Annual; stem 4-14 inches high, simple or branched, puberulent or somewhat glabrous; leaves linear-oblong or lanceolate, obtuse, entire or crenulate-dentate, slender petioled; inflorescence in spike-like racemes; calyx strongly nerved, upper lip entire, lower 2-cleft, teeth ovate, mucronate-acute; corolla blue, but little exceeding the calyx. Dry soil,

prairies; June-August; frequent in western Iowa; Page, Shelby, Fremont, Polk, and Decatur counties; reported from Pottawattamie, Harrison, Story, Fayette, and Muscatine counties.

S. pitcherí Torr. Perennial; stem 2-5 feet high, branched; leaves linear or linear-oblong, sessile or short-petioled, entire or dentate; corolla-tube exserted. Forms from Muscatine county have been referred to this western species. (*S. azurea* var. *grandiflora* Benth.)

S. officinalis L. Shrubby; leaves lance-oblong, crenulate. This is the garden sage; reported as an escape from Fayette county.

MONARDA L. Ours erect perennials, with entire or toothed leaves, and conspicuous flowers in bracted heads. Calyx elongated, cylindric, about 15-nerved, nearly equally 5-toothed, throat usually hairy. Corolla tubular, elongated, strongly 2-lipped; upper lip linear, erect, entire or but little notched; lower spreading or reflexed, 3-lobed. Stamens 2, ascending beneath the upper lip, inserted on the throat of the corolla.

M. fistulosa L. *Wild Bergamot*. Stem 2-4 feet high, glabrate to soft-pubescent, branched above; leaves ovate-lanceolate, acuminate, serrate, petioled; heads solitary, terminal; calyx a little curved, hairy in the throat; corolla exserted, 1-2 inches long, greenish-white, purple or purplish-dotted, upper lip pubescent, linear, acute; stamens and style exserted from under the upper lip. Prairies and open woods; June-September; common.

M. punctata L. *Horse-Mint*. Stem 2-3 feet high, whitish-downy; leaves lanceolate, somewhat serrate, petioled, downy beneath; floral bracts yellowish and purplish, sessile, longer than the flowers; heads axillary and terminal; calyx-teeth short, rigid, soon spreading; corolla smoothish, yellowish, upper lip purple-spotted. Sandy soil; July-September; infrequent; Dubuque, Muscatine, Louisa, Des Moines, Cedar, Johnson, Linn, and Jefferson counties.

BLEPHILIA Raf. Perennials, with small purplish or bluish flowers in dense axillary or terminal globose heads. Calyx 2-lipped, 13-nerved; upper lip 3-toothed, lower 2-toothed. Corolla about equally 2-lipped, throat inflated; upper lip short, erect, entire; lower spreading, unequally 3-cleft. Stamens 2, ascending, exserted.

B. hirsuta (Pursh) Torr. Whole plant hairy; stem 1-3 feet high, widely branched; leaves ovate or ovate-lanceolate, acuminate, base rounded or subcordate, rather long-petioled, slightly serrate; bracts lanceolate to linear-lanceolate; calyx hairy; corolla pale, a little pubescent, purple-spotted. Rich woods; June-August; infrequent; Winneshiek, Jones, Jackson, Johnson, Henry, and Dickinson counties; reported from Fayette and Story counties.

B. ciliata (L.) Raf. Stem 1-2 feet high, simple or branched, downy; leaves lanceolate or oblong-lanceolate, obtuse, obscurely serrate, short-petioled or the upper sessile; leaves of the sterile shoots, ovate or oval, slender-petioled, crenate-denticulate; outer bracts ovate, acute, colored, ciliate; corolla hairy. Dry woods; June-August; infrequent; Henry county.

LOPHANTHUS Benth. Erect perennials, with serrate petioled leaves, and small flowers in dense sessile glomerules which are collected into continuous or interrupted spikes. Floral leaves of short ovate acuminate bracts. Calyx oblique, 15-nerved, 5-toothed, upper teeth longer. Corolla 2-lipped; upper lip nearly erect, 2-lobed; lower spreading, 3-lobed, middle lobe crenate. Stamens 4, exserted; upper pair declined; lower pair shorter, ascending, surpassing the upper pair.

L. scrophulariaefolius (Willd.) Benth. *Giant-Hyssop.* Stem 3-6 feet high, obtusely 4-angled, pubescent; leaves ovate or ovate-oblong, acuminate, base cordate, more or less pubescent; calyx-teeth lanceolate, acute; corolla conspicuous, purplish; spikes mostly interrupted. Open woods; July-September; frequent; Winneshiek, Johnson, Henry, Appanoose, Decatur, Fremont, Story, Winnebago, Dickinson, and Emmet counties; reported from Fayette, Muscatine, Hamilton, and Woodbury counties. (*Agastache scrophulariaefolia* (Willd.) Kuntze.)

L. nepetoides (L.) Benth. Stem 3-6 feet high, sharply 4-angular, glabrous or slightly puberulent; leaves ovate or ovate-oblong, acuminate, crenate-serrate, base cordate; spikes linear, cylindrical, continuous; bracts many, ovate, acute; calyx-teeth ovate, obtuse; corolla inconspicuous, pale greenish-yellow. Open woods; July-August; less frequent than the preceding which it closely resembles; Winneshiek, Des Moines, Johnson, Henry, Van Buren, Decatur, Ringgold, Page, Fremont, Story, and Emmet counties; reported from Fayette and Scott counties. (*Agastache nepetoides* (L.) Kuntze.)

NEPETA L. Perennials. Calyx tubular, obliquely 3-toothed, 15-nerved. Corolla 2-lipped; upper lip emarginate or 2-lobed; lower spreading, 3-cleft, the middle lobe the largest, 2-lobed or entire; throat dilated. Stamens 4, ascending, not exserted, lower pair shorter.

N. cataria L. *Catnip.* *Catmint.* Stem 2-3 feet high, erect, branched, downy; leaves ovate to oblong, coarsely crenate, whitish downy beneath, base cordate; floral leaves small and bract-like; flowers in cymose clusters which are collected into interrupted spikes or racemes; corolla whitish, dotted with purple. Waste places; July-September; common.

N. glechoma Benth. *Ground Ivy.* *Gill-over-the-ground.* Stems procumbent or creeping, somewhat pubescent or glabrous; leaves all alike, long-petioled, reniform, coarsely crenate, green on both sides; flowers 2-3 in the axils of the leaves; corolla light blue, twice the length of the calyx. Waste places near dwellings; April-June; frequent. (*Glechoma hederacea* L.)

DRACOCEPHALUM L. Perennials, with serrate or incised leaves, and blue or purple flowers in axillary and terminal bracted clusters. Calyx tubular, 15-nerved, 5-toothed in ours, the upper tooth the largest. Corolla 2-lipped; the upper lip emarginate; lower lip 3-lobed. Stamens 4, didynamous.

D. parviflorum Nutt. Annual or biennial, glabrous or somewhat pubescent, 6-20 inches high; leaves ovate, oblong, or lanceolate, petioled; flowers in dense terminal spikes or in the upper axils; corolla but little exceeding the calyx, light blue. Sterile soil; May-August; reported from Iowa by Arthur. The species probably occurs near our northern border.

SCUTELLARIA L. SKULL-CAP. Perennials, not aromatic, with axillary opposite solitary or racemose flowers. Calyx campanulate, 2-lipped, closed after flowering; lips entire, the upper with a helmet-like appendage. Corolla 2-lipped; upper lip arched, entire or slightly notched; lower lip spreading, notched; lateral lobes more connected with the upper lip, tube long-exserted, throat dilated. Stamens 4, ascending beneath the upper lip; anthers ciliate or bearded; lower 1-celled, upper 2-celled. Nutlets rough-granulate.

S. versicolor Nutt. Stem 1-3 feet high, erect, soft-pubescent; leaves ovate, cordate, petioled, obtuse, crenate-toothed, rugose; the floral bracts ovate, entire; flowers rather large, in terminal simple racemes; corolla-lips nearly equal, upper bright blue, lower whitish, lateral lobes distinct. Rich woods; June-July; frequent; Winneshiek, Allamakee, Louisa, Des Moines,

Lee, Henry, Johnson, Van Buren, and Decatur counties; reported from Fayette, Scott, and Muscatine counties. (*S. cordifolia* Muhl.)

S. parvula Mx. Stem erect, 3-10 inches high, glabrous or pubescent, branching from the base, filiform subterranean stolons bearing a string of tubers; leaves ovate or ovate-lanceolate, sessile by a slightly cordate or truncate base, lower petioled, obtuse, entire or obscurely toothed; flowers solitary axillary, pedicelled; corolla violet, pubescent, 2-3 times the length of the calyx. Sandy prairies; May-June; frequent throughout the state; Winneshiek, Allamakee, Scott, Henry, Wapello, Johnson, Appanoose, Wayne, Decatur, Ringgold, Pottawattamie, Shelby, Chickasaw, Emmet, and Lyon counties; reported from Fayette, Muscatine, Story, and Woodbury counties.

S. galericulata L. Stem 1-3 feet high, erect, glabrous or slightly pubescent, simple or branched; leaves ovate-lanceolate or oblong-lanceolate, thin, acute, serrate or nearly entire, sessile or short-petioled, base slightly cordate; flowers few, rather large, short-pedicelled, axillary; corolla blue. Wet places; July-August; infrequent; Fayette, Story, Emmet, Hancock, Winneshiek, and Cerro Gordo counties; reported from Scott and Hamilton counties.

S. lateriflora L. *Mad-dog Skullcup.* Stem 1-3 feet high, glabrous, much branched; leaves thin, ovate-lanceolate or oblong-ovate, long-petioled, acuminate, coarsely serrate, base rounded, the lower floral leaves similar; flowers small, in axillary or terminal small 1-sided racemes; corolla blue, rarely white, lips short and equal. Moist places; July-August; frequent and widely distributed; Winneshiek, Jackson, Muscatine, Louisa, Lee, Johnson, Story, Appanoose, Decatur, Winnebago, Emmet, and Lyon counties; reported from Fayette, Scott, Monona, and Woodbury counties.

PRUNELLA L. Perennial herbs, with simple or branched stems, and 3-flowered sessile axillary clusters collected into terminal heads or spikes. Calyx tubular, about 10-nerved, 2-lipped; upper lip 3-toothed; lower 2-cleft. Corolla ascending, 2-lipped; upper lip erect, arched, entire; lower reflexed-spreading, 3-cleft, middle lobe denticulate. Stamens 4; filaments 2-toothed, the 2-celled anther on the lower tooth. Usually spelled *Brunella*.

B. vulgaris L. *Self-heal.* Stem 1-2 feet high, glabrous; leaves ovate, oblong or oblong-lanceolate, entire or toothed, petioled; floral bracts round-ovate, nervose, pointed, spikes dense, oblong-ovoid; calyx purplish; corolla longer, violet to purplish. Open upland woods; June-September; common.

PHYSOSTEGIA Benth. Glabrous erect perennials, with sessile lanceolate serrate leaves, and large showy rose-colored or purplish flowers in leafless terminal spikes. Calyx campanulate, about equally 5-toothed. Corolla exerted, funneliform, throat inflated, 2-lipped; upper lip erect, entire; lower spreading, 3-lobed, middle lobe notched. Stamens 4.

P. virginiana (L.) Benth. *False Dragon-head.* Stem 1-4 feet high; spikes terminal, solitary or panicled; flowers opposite, in the axils of small bracts. Moist woods; August-September; frequent; Winneshiek, Jones, Linn, Johnson, Des Moines, Decatur, Fremont, Story, Winnebago, and Lyon counties; reported from Fayette, Muscatine, and Woodbury counties.

MARRUBIUM L. Ours a white-woolly aromatic perennial, with petioled round-ovate crenate leaves, and the many flowers in remote axillary whorls. Calyx tubular, 5-10-ribbed, nearly equally 5-10-toothed. Corolla 2-lipped; upper lip erect, notched; lower spreading, 3-cleft. Stamens 4, included.

M. vulgare L. *White Hoarhound.* An Old World species, escaped from gardens into waste places; Fremont county; reported from Fayette and Jackson counties.

LEONURUS L. Ours a perennial. Flowers in close axillary whorls. Calyx 5-nerved, with 5 spine-tipped teeth. Corolla 2-lipped; upper oblong, arched, entire; lower spreading, 3-lobed. Stamens 4, ascending under the upper lip. Nutlets truncate, 3-angled.

L. cardiaca L. *Motherwort*. Stem 2-5 feet high, more or less pubescent; leaves petioled, palmately 3-5-cleft, lobes cut-toothed or incised, base cuneate to cordate; corolla purple, pink or white, upper lip bearded. Waste places near dwellings; June-September; frequent in the eastern counties; Winnesieck, Johnson, Des Moines, Appanoose, Decatur, and Fremont counties; reported from Fayette, Scott, Muscatine, and Story counties.

LAMIUM L. A decumbent herb, with mostly cordate incised or doubly-toothed long-petioled or sessile leaves, and small purplish flowers in axillary clusters. Calyx 5-nerved, 5-toothed, awl-pointed. Corolla dilated in the throat, 2-lipped; upper lip oblong, arched, galeate; lower spreading, 3-lobed, middle lobe emarginate. Nutlets truncate at the apex.

L. amplexicaule L. *Dead-Nettle*. An Old World weed reported from Lee county.

GALEOPSIS L. Annual, with spreading branches, and many-flowered axillary whorls. Calyx tubular-campanulate, 5-nerved, 5-toothed, spinescent. Corolla 2-lipped, throat dilated; upper lip arched, nearly entire; lower spreading, 3-cleft, middle lobe obcordate, palate with 2 teeth at the sinuses. Stamens 4, ascending under the upper lip, exserted.

G. tetrahit L. *Hemp-Nettle*. Stem 1-3 feet high, hispid, swollen below the joints; leaves ovate, thin, acuminate, coarsely serrate, petioled; corolla purplish, twice the length of the calyx. Waste places; June-September; infrequent; Winnesieck county.

STACHYS L. *HEDGE-NETTLE*. Ours perennials, with the whorls 2-many-flowered, collected into a terminal raceme or spike. Calyx tubular-campanulate, 5-10-nerved, 5-toothed. Corolla 2-lipped; upper lip arched, entire, pubescent; lower spreading, 3-lobed; throat not dilated. Stamens 4, ascending, often deflexed to the sides of the throat. Nutlets obtuse.

S. aspera Mx. Stem 1-4 feet high, retrorsely hispid to nearly glabrous; leaves thin, oblong-ovate to oblong-lanceolate, acuminate, obtusely serrate, distinctly petioled; flowers in a slender interrupted spike; calyx glabrous or with a few bristles; corolla red-purple. Low places; July-September; common; Winnesieck, Johnson, Henry, Union, Montgomery, and Shelby counties; reported from Fayette, Story, Emmet, Sioux, and Woodbury counties.

S. palustris L. Stem 1-4 feet high, densely hirsute with spreading or reflexed hairs or roughish-hirsute on the angles; leaves ovate-lanceolate to oblong-lanceolate, crenate-serrate, acuminate, sessile or short-petioled, hairy or pubescent especially beneath; calyx pubescent or hirsute. Low places; June-August; frequent; Dubuque, Jackson, Johnson, Appanoose; Decatur, Ringgold, and Story counties; reported from Fayette and Scott counties.

PLANTAGINACEAE Lindl. PLANTAIN FAMILY.

Low herbs, with radical leaves, and regular 4-merous flowers in scapose spikes. Stamens 4, inserted on the corolla-tube and alternate with its lobes, exserted or sometimes included. Ovary free, 2-4-celled. Fruit a membranous capsule.

PLANTAGO L. *PLANTAIN*. Annuals or perennials with ribbed leaves. Calyx of 4 membranous imbricated persistent sepals. Corolla withering-per-

sistent, 4-parted, scarious. Stamens 4 or rarely 2. Ovary 2-celled, rarely 3-4-celled. Capsule in ours 2-celled, circumscissile, with one to several seeds in each cell.

P. rugelii Decaisne. Leaves ovate to oblong, thinnish, pale, smooth, base of the petioles purple; spike 1-2 feet long, apex attenuated and sometimes branched; capsule acutish, line of dehiscence much below the middle and hidden by the calyx; seeds oval-oblong, not reticulated. Moist soil; June-September; common.

P. major L. *Common P.* Leaves similar to the preceding but thicker, often pubescent, base of the petioles green, spike 4-6 inches long, obtuse, densely flowered; capsule ovate, obtuse, line of dehiscence near the middle above the calyx; seeds angled, reticulated. Waste places near dwellings; June-September; less common than the preceding.

P. lanceolata L. *English P.* Biennial or perennial; leaves narrowly oblong-lanceolate, acuminate both ways; scape angled, longer than the leaves; spike ovate or cylindric; bracts and sepals scarious, brownish. Waste places, streets; May-September; infrequent; Decatur county; reported from Story, Fayette, and Van Buren counties.

P. aristata Mx. Annual, loosely villous or glabrate; leaves narrowly lanceolate to linear, green; bracts conspicuous, narrowly attenuate, more than twice the length of the flowers; spike dense, cylindrical or oblong; sepals oblong, obtuse, scarious-margined; corolla-lobes spreading, broadly ovate. Prairies and waste places; May-September; common and spreading; Decatur, Appanoose, Van Buren, Lee, Henry, Muscatine, Winneshiek, Calhoun, Ringgold, Montgomery, and Pottawattamie counties; reported from Story county. (*P. patagonica* var. *aristata* Gray.)

P. gnaphaloides Nutt. Annual, canescently villous, the wool often floccose and deciduous; leaves linear; bracts inconspicuous, oblong or linear-lanceolate, scarcely longer than the calyx; flowers similar to those of the preceding species. Waste places; May-August; infrequent; Lyon, Emmet, Bremer, and Fremont counties; reported from Sioux, Humboldt, and Fayette, counties. (*P. purshii* R. & S. *P. patagonica* var. *gnaphaloides* Gray.)

P. virginica L. Winter annual or a fibrous-rooted biennial, soft-pubescent or hairy; leaves spatulate or obovate-oblong, entire or repand-denticulate, 3-5-nerved, short-petioled or nearly sessile; scape 2-8 inches high; spike rather dense, 2-4 inches long; capsule usually 2-4-seeded. Sandy soil; May-September; infrequent; Muscatine and Lee counties.

APPENDIX.

Atragene americana Sims. *Purple Virgin's Bower.* Perennial trailing or twining vine, with opposite petioled trifoliolate leaves, and large solitary axillary flowers; leaflets ovate, acute, entire or toothed, somewhat cordate; sepals large, purplish blue; petals small, spatulate; stamens many; styles persistent, plumose. Open rocky woods; May-June; rare; Winneshiek county. (*Clematis verticillaris* DC.)

Nelumbo lutea (Willd.) Pers., **Didiplis linearis** Raf., and **Ammannia coccinea** Rottb. were collected in Appanoose county during the season of 1899.

Myriophyllum scabratum Mx. Decatur county.

Rhamnus alnifolia L'Her. and **Rubus triflorus** Richard, were received from Winneshiek county.

Tribulus terrestris L. A pubescent prostrate or ascending annual, with pinnate petioled stipulate leaves, and solitary peduncled flowers. Stamens 10. Fruit 5-angled, spiny, splitting into 5 3-5-angled segments. An introduced plant belonging to the caltrop family. (ZYGOPHYLLACEAE Lindl.) Reported as occurring near Fruitland, Muscatine county by Prof. Pammel.

Prunus chicasa Mx. *Chickasaw Plum.* A small tree; leaves lanceolate or oblong-lanceolate, acute, serrulate; flowers small, in lateral umbels; drupe red, thin-skinned. Reported from Dubuque (Macbride) and Muscatine (Reppert) counties. (*P. angustifolia* Mx.)

Viburnum pubescens petiolatum n. var. A low shrub, 3-5 feet high, with slender grayish branches, opposite leaves, and cymose flowers. The leaves are broadly oval to nearly orbicular, acuminate, sharply and somewhat irregularly dentate, velvety-pubescent beneath, glabrous above, base cordate, petioles one-half an inch to an inch in length; fruit oblong or oblong-oval, 3-4-tenths of an inch long by 2-tenths of an inch wide; stone mostly plane on one side and convex on the other, two-grooved on both surfaces. Rocky woods; May, fruit ripe in September; infrequent; Johnson and Jefferson counties.

Viburnum prunifolium L. and **Sambucus racemosa** L. Reported from Dubuque county.

Sicyos angulatus L. Decatur county

Apocynum pubescens R. Br. Decatur county, one specimen collected in July, 1897.

Conringia perfoliata Link. An erect glabrous annual herb; stem 1-3 feet high; leaves elliptic or ovate, entire, sessile and cordate; flowers yellowish white, racemose; siliques long-linear, angled, valves 1-3-nerved; seeds in 1 row in each cell. Waste places, introduced; reported from Lyon and Story counties. (CRUCIFERAE.) (*C. orientalis* (L.) Dumort.)

Vicia sativa L. Annual, pubescent or glabrate; spreading, ascending or climbing; stem 1-3 feet long; stipules broad, toothed; leaflets varying from obovate to oblong or oblanceolate, apex obtuse, truncate or retuse, mucronate; flowers bluish-purple, 1 or 2 in the axils; pod linear-oblong, glabrous. Waste places; May-August; infrequent; Winneshiek county.

Cornus circinata L'Her. Reported from Dubuque and Muscatine counties.

January 1, 1900.

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ERRATA.

Page 68, lines 5, 10, and 22 for Pottawattomie read Pottawattamie. The same mistake occurs several times in Part 1.

Page 74, last line for gounds read grounds.

Page 90, line 27 for *D. connata* read *B. connata*.

Page 98, line 15 for lowers read flowers.

Page 113, line 38 for *Myosotus* read *Myosotis*.

Page 127, line 7 for Decatus read Decatur.

